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पुस्तकालय

गुरुकुल कांगड़ी विश्वविद्यालय, हरिद्वार

वर्ग संख्या............... आगत संख्या...............

पुस्तक-वितरण की तिथि नीचे अंकित है । इस तिथि सहित ३० वे दिन तक यह पुस्तक पुस्तकालय में वापिस आ जानी चाहिए । अन्यथा ५० पैसे प्रति दिन के हिसाब से विलम्ब-दण्ड लगेगा ।

Central Library

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GILA BULLETIN

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FOURTH CENTRAL PAY COMMISSION REPORT

Reproduced below are the extracts from the Fourth Central Pay Commission Report. The commission has recommended that a committee may be constituted to draw up suitable proposals in regard to the pay scales, qualifications, recruitment levels etc. for the Library personnel in the Govt. of India. All members of GILA and Library professionals are requested to send their views to be incorporated in Joint Memorandum which GILA plans to prepare for consideration by the Review Committee.

RECOMMENDATIONS OF FOURTH CENTRAL PAY COMMISSION

CHAPTER 11

X. Library staff

11.57. There are 1943 librarians spread over different department of the Government of India. The departments of Education, Culture, Railways and the Ministries of Defence, Information and Broadcasting employ about 49 per cent of them.

11.58. Almost every department of Government of India has a library with at least one post of librarian. There is no adequate channel of promotion. It is only in the Department of Culture, Education, Railways and Ministry of Defence that there is a hierarchy providing some prospects of promotion.

11.59. About 60 per cent posts of librarian are in the pay scales of Rs.260-430, 330-560, 425-700, 550-900 and 650-1200. The remaining posts are spread over some 20 other scales. There are posts in the pay scales of Rs. 210-290, 210-270, 200-250 and 196-232 which are for library attendants and junior library ttendants.

11.60. There is no uniformity in the recruitment qualifications and posts with identical designations do not always have the same qualifications. We find that for the existing pay scale of Rs.650-1200 the recruitment qualifications vary from bachelor's degree and degree/diploma in Library Science and experience, to master's degree with degree/diploma in Library Science and experience. The qualifications for direct recruitment in the pay scale of Rs.260-430 are generally a high school certificate with one year certificate of library science. Graduate with degree or diploma in Library Science are recruited in the pay scale of Rs.425-700. Post-graduate with degree/diploma in Library Science are recruited in the pay scale of Rs. 700-1300. Post-graduate with 7 years experience are recruited in the pay scale of Rs.1100-1600 and those with more than 10 years experience in the pay scale of Rs.2000-2250.

11.61. The professional associations of the librarians, including the Government of India Librarian Association, have urged that multiplicity of entry points should be dispensed with and restricted to one or two points. They have also suggested rationalisation of recruitment qualifications so that posts in similar scales of pay may have comparable qualifications. A suggestion has also been made for the formation of a centralised cadre of librarians.

11.62. The Department of Culture has proposed that posts of librarians should be given the pay scales recommended for librarians in the universities and colleges, as the qualifications and nature of work are comparable.

11.63. There are difficulties in reclassifying the posts of librarians and specifying their qualifications and recruitment levels. The pay scales, qualifications and recruitment levels of responsibility will really depend on several factors, mainly on the size of the library, its character and importance. To draw up suitable proposals in this regard a committee may be constituted to undertake this work. Pending such a review by the Committee, we recommend that librarians and library staff may be given the revised scales of pay proposed in chapter 8.

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CHAPTER 23 : PROMOTION POLICY

23.1. Every employee who joins service, looks forward to a satisfactory career of progression. It is therefore necessary that the State, as the biggest employer, should lay down a fair and well-defined policy for the promotion of its employees. That in fact is one of the two basic conditions of a good public service, the other being the security of service, for which care has been taken in article 311 of the Constitution and the case law which has developed on it.

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23.3. It has been represented by the unions and associations of government employees that measures should be taken to improve their promotional prospects. It has been pointed out that promotion to a higher grade is dependent upon the availability of vacancies which are limited. Accordingly, in most of the cadres a large number of employees have little opportunity for promotion and continue in the same scale of pay and stagnate after reaching the maximum. It has, therefore, been urged that every employee should be able to get at least one promotion after 15 years of service.

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23.10. We are also of the opinion that the present scheme of selection grades, which has not provided uniform benefit to various categories of employees, should be reviewed.

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At the same time, there should be cadre reviews after a prescribed period with a view to identifying the grades/posts which could be upgraded taking into account their duties and responsibilities and consistent with the need to promote efficiency in administration.

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CHAPTER 29 : EFFICIENCY IN ADMINISTRATION

29.1. We have here considered some of the general problems connected with pay administration. In doing so, we have kept in view the present structure of the administration and the direction in which changes may be desirable and feasible in the pay system.

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29.6 Care should be taken to ensure that a fair share of the country's best talent is recruited to its services.

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29.7 Various suggestions were made for grant of more allowances-particularly to employees belonging to professional and technical categories. We are also aware that officers have sometimes to work much beyond the prescribed hours on occasions like accidents or natural calamities. We have taken these factors into consideration, but our general approach has been to discourage payment of compensation like overtime allowance and we do not favour its extension. We have recommended the continuance of several allowances and facilities and have tried to improve them wherever necessary. We thought of suggesting an allowance for the purchase of scientific and other technical books and journals so that employees may be able to keep their knowledge upto date, but their cost has gone up so high that it will really not help if the purchase of a book or a journal is subsidised by government. It will therefore be better if departmental libraries are developed and they provide relevant abstract of articles, book reviews, etc. for different groups and disciplines. Government may consider expanding these facilities so that many more officers may be able to utilise them.

29.8 The question of granting incentive to officers and staff who acquire higher qualification has also engaged our attention.

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We suggest that some incentive should be given to employees who acquire qualifications which are useful for their work and contribute to their efficiency.

Information

NISSAT signs transfer agreement for CDS/ISIS

UNESCO Division of the UNESCO Library Archives and Documentation Services has developed a mini/micro computer-based Computerised Documentation System (CDS)/Integrated Set of Information System (ISIS) for storage, processing and retrieval. It is a generalized integrated system that can handle any alphanumeric data of fixed or variable lengths. CDS/ISIS has a comprehensive collection of programmes for input, management and output. The file structure permits the users to add, modify and delete the records, gain access to master file via any element in the corresponding database, to build indexes from any keywords and to create a variety of print formats like reports, catalogues, indexes, etc.

Appreciating that the package holds immense potential for use in different institutions in India, NISSAT has already signed the transfer agreement with UNESCO. Further details for transfer within the country may be obtained from NISSAT secretariat, Department of Scientific and Industrial Research, Technology Bhavan, New Mehrauli Road, New Delhi.

Life Members from April to June 1986

S.No.	Name	Address
1.	Sh. Balbir Singh	Delhi Public Library Delhi-110006
2.	Sh Suresh Kumar	I.I.P.A., New Delhi
3.	Mrs A.G. Gandhi	Indian Banks Assn. 3, Veer Nariman Road, Bombay.
4.	Miss Srinidhi Iyengar	3/4 - 797, Koche Guda Hyderabad
5.	Miss Savitri	Librarian, Government Boys Sr. Sec. School Laxmi Nagar, New Delhi.
6.	Miss Karuna Purohit	I.P.C.L. Library Baroda.
7.	Sh. S.R. Kumar	N.R.D.C. of India New Delhi.

Individual Members from April to June 1986

S.No.	Name	Address
1.	Miss Sipra Sen	
2.	Mrs Una Sehgal	National Institute of Pub. Co-opr. & Child Development, New Delhi.
3.	Sh Pritipal Singh	Sangeet Natak Academy, New Delhi

Computer library

A committee to study whether to establish the world's largest electronic library, which would be stored in a central computer, that can be tapped by personal computers and facsimile machines via telephone lines, was established by 34 Japanese publishing, advertising and telecommunications companies at a recent meeting.

The library's central computer would contain the latest newspaper and magazine articles, indexed by more than two headlines.The idea for the library was initiated by the Asahi Shimbun, a major daily newspaper, Dentsu Inc., Japan's largest advertising agency, and Nippon Telegraph and Telephone Corp.

Anyone who wanted information about the weather, for example, would connect their personal computer to the library by telephone and call up the library's list of articles under the weather heading.

Copies of articles, pictures and graphs stored in the central computer would be available to users with facsimile machines.

The committee will also discuss the possibility of transmitting specific types of news, such as economics or sports, to individual users each morning.

Committee members said the service would at first be used more by organizations than by individuals. They have not decided whether to offer the service free of charge.

(Amrita Bazar Patrika 25.5.'86)

PEOPLE IN THE NEWS

Shri Vijai Govind, Chief Doc. Officer, Raja Rammohun Roy, National Educational Resources Centre has been nominated by the Ministry of Human Resource Development, Department of Education, as a member of an Advisory Committee of a Monitoring Cell of National Book Production Statistics of the National Library, Calcutta.

He is also the administrator of the National Agency for International Standard Book Numbering (ISBN) system being implemented through the Raja Rammohun Roy National Educational Resources Centre, Ministry of Human Resource Development, Department of Education.

National policy on library and information system too vague

A NEW wave is sweeping all over India. It is the "Policy wave". In the wake of National Policies on Education, Health, Industry, etc., there is now one more on Library and Information System. A committee on National Policy on Library and Information System under the chairmanship of Dr. D. P. Chattopadhyaya has been appointed by the Government of India. The committee has so far visited Bombay and Madras. A publication entitled "Documents on National Policy on Library and Information System" has been brought out by the Raja Rammohun Roy Library Foundation, Calcutta (RRRLF) for eventual submission to the Government of India. Comments and suggestions have been invited from library scientists, educationists, information system analysts and people interested in library service and education by February 15, 1986.

The publication contains two policy proposals, one formulated by the RRRLF and the other by the Indian Library Association, Delhi. The policy proposal of the RRRLF is being taken up here for consideration as this is found to be a little more comprehensive than the other.

I. Composition of the Committee: The committee has 14 members on it, inclusive of the chairman. Four are non-professionals and the rest professionals. Of the ten professionals, one represents the information system and nine the library field. Of the latter only three are working librarians. Further the majority of library professionals belong to academic libraries.

The committee thus is packed with "retired personnel."

It may be futile to expect them to bestow active attention to shaping the library movement of the 21st century. The dominating presence of academic librarians with inadequate representation for highly specialised areas of the library profession has deprived the committee of valuable new insights required for charting the course of the movement. The poor representation provided to the Southern States (there are only three members from these states) is extremely unfair when it is known that the South especially Tamil Nadu has been the pioneer and forerunner in this movement.

II. The Apex Body: The policy proposes the establishment of a central co-ordinating council or board at the national level. Further it is stated that with suitable modification in its constitution, the RRRLF itself can become the apex body for the National Library and Information System. The committee has taken this for granted and has not even bothered to state anything to substantiate the foundation's claim. Perhaps this is in keeping with the issuance of the policy statement by the RRRLF and in having the chairman and director of the foundation as the chairman and member-secretary respectively of the committee.

III. State Library Councils or Committees: The policy as proposed adds that the State Governments should set up State library councils or committees under the authority of law for the co-ordinated development of library services.

This is no innovation. In Tamil Nadu a State Library Committee constituted by the Government under the Public Libraries Act 1948, is supposed to advise the government on such matters as the Government may refer to it. The Committee has remained utterly dormant. In 1953, Dr. S. R. Ranganathan referring to the Committee said, "The State Library Committee appears to have forgotten its own existence. It is still in the long sleep of a new born babe. When it woke up on two occasions during the last two years, it felt dazed and dropped down to sleep without doing anything substantial". Things are no better even now after 32 years. The last one heard about this committee was in 1970. I was nominated to represent the Madras Library Association in the Committee, but it has not met even once since then. Perhaps the Government needs no advice!

The setting up of a committee is not a difficult job, but drawing up a frame of responsibilities with a pattern of accountability is. It is strange that there is nothing in the policy proposed on how a State level committee could function.

IV. National Libraries: The policy proposes that to preserve the national information output and conserve the library heritage the Government shall continue to maintain and develop the National Library, Calcutta, together with a central deposit library and three regional deposit libraries in Delhi, Bombay and Madras. It further adds that the State Government should also take steps to collect and preserve all significant publications in regional languages in the State Central libraries under State Law.

Let us now examine the implications.

(a) National Library, Calcutta: A National Library should be located in a central place so that it could be easily accessible to everyone. Does the National Library at Calcutta fulfil this criterion It has been the scene of a "civil war" and two high power committees (Jha and Khosla committees) were set up to go into its working, suggest measures for its efficient functioning and future development and to enquire into strained relations among the staff. As it is, the Calcutta library is more a notional than a national library. Why should it not be made a Regional Deposit Library and the National Library shifted to Hyderabad or some other central place?

(b) Central Deposit Library: Apart from stating that the Government shall maintain and develop a Central Deposit Library, the policy does not spell out details of its location, purpose, functions, etc.

(c) Regional Deposit Libraries: The policy envisages three Regional Deposit Libraries. At present three libraries in these regions, viz., the Delhi Public Library; the Asiatic Society Library, Bombay and the Connemara Public Library, Madras also serve as the National Libraries being the beneficiaries of the Delivery of Books Act.

The policy is not quite explicit in stating whether—i) the central Government should maintain and develop three new Regional Deposit Libraries in Delhi, Bombay and Madras, or ii) the existing National Libraries at these places should continue as the Regional Deposit Libraries.

If the libraries in Calcutta and Delhi are to be financed from the Consolidated Funds of India, why not those in Bombay and Madras also?

If the three existing National Libraries are to continue and serve as the Regional Deposit Libraries the main problem would be the additional burden and this would definitely distort their normal functioning. For example, the Connemara Public Library, Madras, is the State Central Library for Tamil Nadu. It has its own functions and duties to attend to. Unfortunately it has so far not been able to discharge even its basic functions to the level expected. So we have to consider whether it would serve its purpose any better by mixing up the functions of a National Library also. This applies equally to the libraries in Delhi and Bombay.

In this connection the observation of Mr. Girija Kumar in his book "Library Development in India" is pertinent. "The burdening of the National Library, Calcutta, the Connemara Public Library, and the Asiatic Society, Bombay, and the Delhi Public Library with the additional responsibility of receiving, processing and servicing books deposited under the Delivery of Books and Newspapers Act is threatening to be the last straw on the camel's back, straining their resources and thus distorting their normal functioning. This is the result of government shirking its duty to set up a central apex library." Incidentally it is to be noted that Mr. Girja Kumar is also a member of the committee of the RRRLF which formulated the policy proposal!

V. Delivery of Books Act: According to the policy proposed, the Delivery of Books and Newspapers Act, 1954, in the light of experiences, needs amendment in the following manner:

(i) One copy of each publication is to be compulsorily deposited in the National Library.

(ii) A second copy is also to be deposited in the National Library on request.

(iii) One copy of each publication in Hindi and each regional language are to be deposited in the regional deposit centre concerned.

Further one copy received by the National Library is to be utilised for the preparation of the Indian National Bibliography (INB) and preserved for posterity and also for use by readers in the library as a last resort. The other copy is to be used for lending. Other steps are also to be taken to plug loopholes in the Act for ensuring larger collections and better coverage by INB.

The position at present is that a copy each of every book published in India is deposited in the National Library, Calcutta and the three other public libraries. Mr. Girija Kumar observes in his book under the head "Delhi Public Library". The decision to make it the fourth library for legal deposit of Indian books is a colossal mistake. The library will now be cluttered with documents for which there are no users".

The operational deficiencies noted are due to clubbing the additional functions of a National Library to the already existing libraries with their own functions to attend to. If the government maintains and develops separate Regional Deposit Libraries in Delhi, Bombay and Madras, there need be no amendments at all to the Act and the status quo could be maintained, which would be right policy to adopt.

As for the amendments suggested in the policy they can be divided into two parts.

(i) National Library: The policy states that one copy of each publication should be compulsorily deposited and a second on request. Practical experience has shown that even under legal obligations not all books published are deposited. So one can very well imagine what would happen to requests! As such the deposit of two copies in this library could be made compulsory and two separate wings, preferably in separate premises, maintained, known as the "National Reference Library" and the "National Lending Library".

(ii) Regional Deposit Centres: As per the proposed amendments in these three centres one copy of each publication in Hindi and each regional language is to be deposited.

a) People especially in Tamil Nadu may consider this as yet another subtle way of imposing Hindi. There would not be much demand for Hindi books and not many of them would be put to use. So no useful purpose would be served by dumping unwanted material in a region where there is no potential clientele.

b) By this amendment the Regional Deposit

Centres would be deprived of books in English. This has to be considered as a grave injustice especially to readers in this part of the region.

c) The amendment proposed just says, "each regional language". It is not quite clear and specific on this aspect. Moreover the singular form of the word "language" used gives room for doubts.

It has not specified the regional language or languages of each region. The policy lacks clarity on such an important aspect. Instead, "regional languages specialisation" may be adopted in the Regional Deposit Libraries. In addition to books in English and if necessary Hindi, the RDLs should be deposited with books in the regional languages.

VI. National Bibliography: The Central Reference Library which was to have been established in New Delhi but is now in the premises of the National Library, Calcutta is publishing for the past quarter century the *"Indian National Bibliography"*. This has not lived up to its standards and the project has not been quite a success. The policy wants this Central Reference Library to be merged with the National Library. So only a change in the management is suggested. It remains to be seen whether a change in the container would bring about any change for the better in the contents.

VII. Reorganisation of the National Library: The policy states that to enable the National Library to discharge its conservation and bibliographical responsibility, reference and lending functions effectively and to perform its leadership role, it shall be reorganised suitably. It has not set out in clear terms how this should be done. It is more theoretical than practical in approach. Perhaps another committee would be appointed to go into this aspect!

VIII. Central Government Grants: The policy states that the resources of the State Governments are to be supplemented by Central Government grants which may be channelled through the agency of RRRLF. This is putting one more hurdle in the way. Of course this is in keeping with its publication of the document and its desire to be treated as the Apex Body!

IX. Role of Library Associations: The policy in stressing the role of library associations at the national and State level in promoting and strengthening the library movement states that they may be given necessary patronage and encouragement for their effective functioning.

To sum up, in general the policy is too vague and nebulous and does not spell out the modus operandi. It is full of the usual "shalls" and "shoulds" but not of "how". This theoretical approach may perhaps be due to the committee being packed with teachers! Formulating policies, bringing in legislation or laying down rules and regulations are not an end but it is in their interpretation and implementation that the troubles start. The Committee would have served its purpose better had it explained specifically how the proposed recommendations would help us to achieve the desired objectives

M. P. Govindaraj

(THE HINDU, Feb 11, 1986)

TOUR TO THE LIBRARIES OF THAILAND, MALAYSIA AND SINGAPORE

The Government of India Librarians Association (GILA) organized a study -- tour to the Libraries/Information Centres of South-East Asian Countries i.e. Thailand, Malaysia and Singapore from 15th to 25th January, 1986. A group of 14 librarians from all over India participated in the tour, some of them with their families. Shri M.K.Jain, President, GILA was the group-leader.

The group visited Pattaya, Bangkok, Genting Highlands, Kuala Lumpur and Singapore. During the stay in Bangkok the group visited National Library, Bangkok where rare books and manuscripts of 17th century AD are available. Ms. Willawan Sapthansapn, Librarian, National Thai Library took the group round various sections of the Library. Some Indian Books were also displayed on the occasion and the members of the group were very pleased to see the same. Thailand Library Association falicitated the librarians from India and hosted a reception in their honour.

In Malaysia Librarians visited University of Malaysia Library, Rubber Research Institute of Malaysia and National Library of Malaysia at Kuala Lumpur. In all these libraries the Librarians were received with warmth and were served with Tea, Coffee and snacks etc. Shri J.S.Soosai, Head of the Rubber Research Institute arranged a nice lunch for the group. He demonstrated the dissemination of Information on Computers in his institute which is completed computarised.

While in Singapore the members of the group visited National Library of Singapore, Singapore Broadcasting Corporation, National University Library of Singapore. At all these places the group members were given welcome and taken round the libraries. The group was entertained with cold drinks, Tea, Coffee and snacks etc. in all these libraries. It was really interesting to see National University Library of Singapore which has been fully computarised.

The members of the group found the libraries of this region really very much advanced and equipped with all latest modern gadgets. The members of the group were moved to see the warmth and affection with which they were welcomed at Bangkok, Malaysia and Singapore. The members of the group found the librarians working in these libraries full of cooperation and having good-will for the Indian Librarians. As a matter of fact they welcomed this study-tour of librarians first of its kind from India. They suggested that many more such study-tours may be arranged. The Executive Committee of GILA and the members of the group appreciated the hospitality extended and the good-will found among librarians and friends in all these libraries.

Conference Reports

The International Conference on the Preservation of Library Materials held in Vienna from 7-10 April 1986.

Recommendations

1. Having been made aware of the enormous scale of the needs for urgent conservation measures to protect library materials - a need confirmed by the participants of the Conference, including those from the developing countries;

2. Having noted the views expressed by the representatives of national libraries and other professional groups that the needs for needs for preservation and conservation of library materials - both retrospective and prospective - can only be solved through a combination of national and international efforts.

3. Being mindful of the unanimous support given to the recommendation on the conservation of library and archival materials by the delegates of all nations of the Cultural Forum in Budapest;

4. Having reviewed the IFLA International Core Programme for Preservation and Conservation (PAC), its objectives, orientation and plan of action;

5. Recalling the successful results of the ongoing IFLA International Core Programmes on Universal Bibliographic Control (UBC), Universal Availability of Publications (UAP) and International MARC (IMP);

6. Endorses the steps already taken by IFLA to establish its International Core Programme on Preservation and Conservation;

7. Welcomes the initiatives of the Library of Congress (USA), the Bibliotheque Nationale (France) and the Deutsche Bucherei (German Democratic Republic) in establishing an international and two regional centres for preservation and conservation in the framework of the Core Programme;

8. Proposes that IFLA, as a means to mobilizing further interest and support, consider designating, as soon as possible, an IFLA Year on Preservation and Conservation, and

9. Recommends that the international library community bring to the attention of the broad public in every country the importance and urgency of preserving library materials which form an essential part of the intellectual heritage of all nations - and stress the irreversible consequences for future generations of continued failure to undertake massive preservation and conservation measures;

10. Recommends that IFLA encourage member associations:

(a) to urge national policy-making bodies to establish guiding principles for formulating and implementing national programmes for preservation and conservation of library materials;

(b) in due course to appeal to governments for the supplementary funds certainly required to implement well-conceived national preservation programmes;

11. Invites member associations of IFLA to play an active role in persuading appropriate institutions to host additional regional centres in other parts of the world;

12. Further recommends that IFLA contribute to the harmonization of international action in this field by working out internationally applicable guidelines, by issuing directories of available facilities and other required publications and by organizing training courses, pilot projects and other activities intended to improve the preservation and conservation of library materials;

13. Urges Unesco and other competent international intergovernmental organizations

(a) to increase the attention given in their programmes to promoting the undertaking of preservation and conservation measures by publishers, printers and paper manufacturers, as well as by librarians, archivists and other information personnel, and

(b) to augment their financial support for activities leading to improved knowledge of the problems involved in preservation and conservation and to the solutions of both retrospective and prospective needs in this field;

14. Recommends that IFLA continue its efforts to associate other competent non-governmental organizatins with its endeavour to establish an effective international programme in preservation and conservation.

RESOLUTIONS

Recognizing that information sources, in whatever form, constitute an essential national and international resource, and that preservation and conservation, in principle, are an integral part of the total information provision, and therefore should become a fundamental component of education for the information profession,the participants of the International Seminar on "The teaching of Conservation and Preservation Management for Librarians, Archivists and Information Scientists" joining sponsored by the IFLA Section on Library Schools and Other Training Aspects, the IFLA Section on Conservation, the FID Committee for Education and Training (FID/ET), the ICA Committee for Conservation and Restoration (ICA/CCR), held at Vienna, Austria, from April 11 to 13, 1986, unanimously adopted the following recommendations to IFLA, FID, ICA and UNESCO:

1. To survey the status, worldwide, of preservation education in Library, Archival, Information Science Schools and other establishments, and to prepare a reference source for publication.
2. To develop "Guidelines for the Teaching of Preservation for Librarians, Archivists and Information Scientists", which can be applied internationally, under the auspices of the IFLA Section on Library Schools and Other Training Aspects and the IFLA Section on Conservation, in cooperation with the relevant bodies of FID and ICA.
3. To sponsor an International Seminar to promote implementation of the developed "Guidelines for the Teaching of Preservation".
4. To make Preservation and Conservation, including Education and Training, a theme of an IFLA Conference within the next three years.
5. To establish international exchanges of teachers and preservation experts to provide education and training opportunities in preservation for librarians, archivists and information scientists, especially in developing countries, at the appropriate levels.
6. To recommend the establishing of Centres for Research and Education for Preservation in developing countries.
7. To recommend the inclusion of preservation into courses for librarians, Archivists and Information Scientists.
8. To endorse the Recommendations of the Conference of Directors of National Libraries on "Conservation of Library Materials", April 7 - 10, 1986.
9. To strengthen communication about preservation education between IFLA, FID, ICA, UNESCO and other relevant bodies, and encourage harmonization of their activities, such as sharing results of research on preservation, in all parts of the world.

(Vienna, April 12, 1986)

APINESS

Asia-Pacific Information Network in Social Sciences (APINESS) was launched in Bangkok at an experts´ meeting convened by UNESCO and Association of Asian Social Science Research Councils (AASSREC) on 12-16 May,1986.

Participants

38 Participants (including UNESCO staff) attending the meeting were representatives of the Social Science Research Councils of the region -- mainly their information and documentation centres, or the national libraries and other national organizations designated by the National Commission of their respective member states to act as national contact points for the newly launched network. As many as 16 countries were represented: Australia, Bangladesh, People´s Republic of Nepal, New Zealand, Pakistan, the Philippines, Republic of Korea, Socialist Republic of Viet Nam, Sri Lanka, Thailand, and Turkey. At the regional level, organizations and already existing networks such as ASTINFO,AMIC and SEDNAP also participated in the meeting.

Framework of Network

The APINESS framework developed at the Bangkok meeting features two levels --national and regional. For the time, the Regional Unit for Social and Human Sciences, UNESCO, will serve as the APINESS Secretariat.

Following are the Office Bearers of APINESS

Chairman : Mr.Rahim Zain(Malaysia)
Vice Chairman:1. Mr.S.P.Agrawal(India)
2. Dr.Muhammad Aslam Khan (Pakistan)

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VI ALL INDIA LIBRARY CONVENTION

The sixth All India Library Convention of GILA was held from September 1-4,1986 at Grand Hotel, Shimla.

The Convention was inaugurated on the morning of 1st September by Shri Sagar Chand Nayyar, Education Minister, Himachal Pradesh. He lauded GILA for selecting Shimla as the venue for this Convention which will focus attention on "THE CHALLENGES OF NEW TECHNOLOGIES" for information storage and dissemination. He emphasised the important role played by the libraries in the education system.

Shri M K Jain, President GILA in his address recalled that GILA was established in Shimla in 1933. He highlighted the use of computers in libraries and asked librarians to use new technologies - microforms, video-technology, computers,telecommunications etc.- to their advantage. With the exponential growth of knowledge we can not keep track of latest developments/ literature unless we make use of computers and other modern equipments.

Prof.(Mrs) Margaret Chatterjee, Director, IIAS,Shimla, presided over the inaugural function.

There were Ten papers contributed to the Convention which was well attended by professionals from all over the country.

HP to enact law on libraries soon

The State Education Minister, Mr.Sagar Chand Nayyar, on Monday said that the state government would enact laws to organise library facilities in the state. The state government would also declare all the high and higher secondary schools in the state as public libraries to offer library facilities to the local community in an organised manner.

Inaugurating a four-day convention of the Government of India Librarian Association, the Education Minister said that the existing machinery and services were not enough for the development of an adequate network of public libraries in the country.

Mr.Nayyar regretted that the existing state of affairs in the libraries wasss far from satisfactory. He also said that hardly five per cent of villages had some sort of a reading room and school libraries were yet to receive the attention they deserve.

He said that Himachal government had earmarked a sum of Rs.18 lakh in the first year of the Seventh Plan for the development of libraries in the state.

Mrs Margaret Chatterjee,director of the Indian Institute of Advanced Studies, Shimla, presided over the convention. About 150 librarians from various parts of the country are attending the convention.

(Indian Express, Sep 3,1986)

UPDATE ON PAY COMMISSION

We reproduce here the letter written by President, GILA to the Union Minister of Finance regarding follow-up action on Fourth Central Pay Commission Report. On next two pages, we give chart of Pay Scales we are seeking for Library personnel (sent to Mr R C Tripathi, Joint Secretary, Department of Culture).

Librarians' panel on pay report

Hindustan Times Correspondent

NEW DELHI, Oct. 6 — A meeting of librarians held under the auspices of Government of India Librarians Association in Delhi on Monday expressed its resentment over the Fourth Pay Commission report which failed to make pragmatic recommendations by not laying down specific pay scales for various categories of library staff. The Government is yet to appoint a Committee on the librarians problems as suggested by the Pay Commission.

A joint Select Committee of various library associations and their functionaries was set up to pursue the matter with the Government. The following were nominated: C. Dabral, MLAI — Chairman; V. K. Jain, GILA — Member-Secretary; Nasib Chand, NILA, C. P. Vashist, ILA/INDAL, C. V. Subbarao, IASLIC, Balbir Singh, DPL and S. N. Mehta, DESIDOC — Members.

THE HINDUSTAN TIMES TUESDAY OCTOBER 7 1986

Respected Shri V.P.Singh,

I wish to bring to your kind notice the recommendations of the Fourth Pay Commission regarding library staff on page 205 Pt.I. At the very outset I wish to state that the librarians working in the Departmental libraries are not satisfied with the recommendations of the Fourth Pay Commission. They were expecting that the commission would remove the present anomalies in the pay scales of librarians and recommend better pay scales. Though the commission has recognized the problems viz. (i) Non-existence of central cadre of librarians; (ii) Stagnation and anomalies in the pay scales of librarians who fall in the lower grades; (iii) Too many entry points; and (iv) Disparity in pay scales of librarians of the universities and colleges and the Government departments yet they have not made specific recommendations.

The Pay Commission has recommended that a Committee may be constituted to study these problems and draw up suitable proposals. In accordance with these recommendations, I on behalf of the members of the Association and library staff working in the Departmental libraries request your good honour to constitute a committee to undertake this onerous task and give suitable recommendations. It will not only be appropriate but also reasonable that the representatives of the Govt.of India Librarians Assocn. and other professional experts are duly associated with this committee.

A copy of the Memorandum submitted to the Fourth Commission by GILA, duly signed by the office bearers of the six Library Assocations of national level, is enclosed for your information.

With kind regards,

Yours sincerely,

(M.K. Jain)

Shri V.P.Singh
Minister of Finance
North Block
New Delhi

Encl.

cc:
1. Shri P.Chidambaram, Minister of State for Personnel, Public Grievances and Pension, North Block, New Delhi.
2. Shri S.Venkataramanan, Fiance Secretary and Chairman, Implementatio Cell, North Block, New Delhi.

TABLE 1

PROPOSED STRUCTURE OF PROFESSIONAL LIBRARY STAFF IN THE CENTRAL GOVERNMENT

TABLE 1

PROPOSED STRUCTURE OF PROFESSIONAL LIBRARY STAFF IN THE CENTRAL GOVERNMENT

S N	PROPOSED NEW DESIGNATIONS	QUALIFICATION EXPERIENCE AND MAXIMUM AGE@@	EXISTING PAY SCALE (OLD)	PRESENT NEW SCALES (4th P.Commn)	PAY SCALES TO BE ADJUSTED	PARITY OF PROPOSED PAY SCALES WITH OTHER EQUIVALENT IN GOVT OF INDIA	TIME SCALE@ PROMOTION AFTER
1.	Sr Lib Asstt/ Sr Doc Asstt	B.A./B.Sc./B.Com+ B.Lib.Sc./Equiv. Diploma in Lib Sc, (26 years)	550-900	1640-60-2600-EB-75-2900	a)1350-2200 b)1400-2300	Sr Investigator Gr. I	5 Years
2.	Lib & Inf.Offr/ Doc. Officer	M.Lib.Sc.or M.A./M.Sc./M.Com+ B.Lib.Sc /Equiv. Dip. in Lib.Sc. (30 Years)	700-1300	2200-75-2800-EB-100-4000	a)2000-3500 b)2200-4000	Section Officer/Asstt.Dir./ Research Officer/Scientist-B	5 Years
3.	Sr Lib & Inf. Offr/Sr Doc Offr	As above + 5 yrs exp. at level 2 above(35 yrs)	1100-1600	3000-100-3500 125-4500	3000-4500	Under Secy/Sr.Res.Officer/ Scientist C	5 Years
4	Principal Lib Inf.Offr/ Principal Doc Offr	M.Lib.Sc or M.A./M.Com/ M.Sc.+ B.Lib Sc./Equiv.Dip. in Lib.Sc.+10 yrs exp. at leve. 2/3(45 years)	a)1500-1800 b,1500-2000	3700-125-4700-150-5000	3700-5000	Dy Secy/Principal Sc.Offr./ Scientist E	3 Years
5.	Dir(Lib & Inf)	As above + 13 yrs exp.at level 2/3/4(48 yrs)	a)1800-2250 b)2000-2500 c)2000-2250	4500-150-5700	a)4100-5300 b)4500-5700	Director/Scientist 'F'	3 Years
6.	Executive Dir (Lib & Inf)/ Dy Dir Gen (Library)	As above + 16 yrs exp.at level 2 or above (50 years)	2500-2750	5900-200-6700	5900-6700	Joint Secretary/Jt. Adviser	3 Years
7.	Dir Gen(Lib)/ Dir.National Library	As above + 6 yrs exp. at level 5/6(52 yrs)	3000(Fixed)	7300(Fixed)	7300(Fixed)	Addl. Secretary	

@@ Maximum age for direct recruits @ Pending formation of library cadre.

TABLE 2
Semi-Professional & Jr. Professional Staff in a Library

S. NO.	DESIGNATION/ POST	QUALIFICATION/ EXPERIENCE	PROPOSED NEW PAY SCALES (4TH PAY COMMN.)	PAY SCALES TO BE ADJUSTED	PARITY OF PAY SCALES WITH OTHER EQUIVALENT IN GOI.	TIME SCALE PROMOTION AFTER
1	Jr. Lib. Attdt.	Hr.Sec.+Certificate in Lib.Sc. or Middle + 3 years exp.	950-20-1150--EB-25-1500	800-12-920-EB-15-1070-20-1150	Daftries	5 years
2.	Sr.Lib.Attdt.	As above+5 Yrs Exp . at level 1	1200-30-1560-EB-40-2040	950-20-1150-EB-25-1500	Sel.Gr Daftry	5 Years
3.	Library Clerk/ Cataloguer/ Classifier	Hr.Sec.+Certificate/Diploma in Lib. Sc.	1350-30-1440-40-1800-EB--50-2200	a) 950-1500 b) 1200-2040	L.D.C.'s/ U.D.C.'s/ Jr. Stenos	5 years
		JUNIOR PROFESSIONAL LEVEL				
4.	Library Asstt./ Doc. Asstt.	B.A./B.Sc/B.Com +B.Lib.Sc./ Eqvt. Dip. in Lib Sc.	1400-40-1600-50-2300-EB-60-2600.	1400-2300	Asstt. in the Ministries	5 Years@

NOTE: @Promotion to the post of Senior Library Assistant/ Senior Documentation Assistant (Table 1).

Mr.M.K.Jain, President GILA;Mr.O.S.Sachdeva, Secretary GILA; and Mr.R.P.Grover,R R Division,M/O I&B met Shri R.C.Tripathi, Joint Secretary, Dept.of Culture in early December 1986. Mr.Tripathi was impressed upon for early constitution of the Review Committee as recommended by the Fourth Central Pay Commission. Shri Tripathi assured that the action has already been initiated and we can expect early announcement. He desired that GILA prepare a chart of all posts suggesting uniform designations and showing revised pay scales for each post. Chart should also give the existing scales (as per Fourth Pay Commission Report) for each of the posts for which we are suggesting higher scale of pay, [That is to say,chart should clearly indicate the pay scales for each post as per Commission Report and those suggested by GILA]. Above two tables were submitted to Mr.R.C.Tripathi in the fourth week of Dec.1986. These tables were prepared after discussions with several professionals and keeping in view our earlier demands as submitted to Fourth Central Pay Commission through Joint Memorandum (see GILA Bulletin, V2 N1,March 1984,4-8).

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GILA

VI ALL INDIA LIBRARY CONVENTION

Shimla, September, 1-4, 1986

Theme : The Challenges of New Technologies

PROCEEDINGS

PRESIDENTIAL ADDRESS

BY
Shri M.K. JAIN
PRESIDENT, GILA

Hon'ble Minister for Education Shri Nayyar, Prof (Mrs) Margaret Chatterjee, fellow librarians, Ladies and Gentlemen:

It is a matter of pride and privilege for me, and for Government of India Librarians Association, that the Sixth All India Library Convention is being held outside Delhi for the second successive time, and this time in serene atmosphere of mountain city of Shimla at a time when the weather here is most pleasant and scenic beauty of Shimla is at its peak.

The theme of this convention, as you are aware, is

"THE CHALLENGES OF NEW TECHNOLOGIES"
with sub themes as:

"New Roles and New Goals for Information Handlers" &

"Future Competencies needed for Library/Information Science Professionals".

Computers are being used in India for over three decades mostly in scientific and technological fields. Even in Libraries/Information centres, computers have been used for more than two decades. But initially, organisations owing computers allowed use of computers to their libraries, after repeated requests from Librarians, allotting not more than 5 to 10 per cent of total time available which obviously was not enough to prove the usefulness of computers in Library environment. In recent years, however, we find that Libraries/ Information centres are going in for separate Mini computers/Micro computers for exclusive use of libraries. This has happened because of fall in equipment costs. In fact the unit costs of handling information by computer are decreasing exponentially and the costs of manually handling information are increasing. Librarians have to face two problems increased flow and generation of literature in every subject and availability of 'New Technologies' to handle information. Today, challenges to library services include shrinking staff, shrinking budgets and increasingly sophisticated demands on the services.

Government Department libraries and special libraries more than academic and public libraries, have always emphasized the provision of information rather than the provision of citations. The emergence of large capacity and relatively inexpensive machines microcomputers and more or less user friendly software packages promise libraries of all sizes to create automated data bases of this information, and in the near future many records are likely to be maintained principally in machinereadable form only. This has already happened in developed countries and the developing countries including India are catching up fast. The next step is to test the feasibility of developing a nationwide library and information network which may include, in addition to libraries, related sectors of the information industry such as booksellers, publishers and information providers. This will enable to share resources and economise on unnecessary duplication of some sources in several libraries. Of course, this will also imply optimum use of New Technologies including microforms, electronic printing, reprography etc.

Present era is also referred as Information Age in which, as the pace of innovation quickens, the information specialist or librarian becomes increasingly important because he is the real link between 'information' and the decisionmaker. But in order to continue to hold this position of importance it is necessary that Librarian deliers good efficiently i.e. provide 'quality information' when it is required. To be able to do this a Librarian has to sharpen his tools constantly and acquire technological skills and awareness which will enable him to utilize fully fruits of 'information technology'. There should be a large scale increase in provision of continuing education by employers. In fact continuing education should be joint and shared responsibility of the individual, the employer, the library schools and the library associations. The Government of India's new training policy has identified the value of refresher courses which have been made mandatory for all group A officers. Amongst library associations, Government of India Librarians Association is doing its bit in continuing education and refresher courses.

By the end of Seventh Five Year Plan almost all important libraries will automate their functions. It is, therefore, essential that we prepare ourselves to take up challenges of managing 'Libraries of Future' now.

Here, I would like to caution librarians that they should not fall into the trap of believing that technology will answer everything. One should carefully examine the pros and cons of automation, including detailed precautions to be taken, and systems analysis to be done, before starting automation.

If the information specialist or librarian understands the transformation taking place in the requirements of information and technology making it possible, then he or she will be called on to play a central role in the process. If the specialists resist, they could be bypassed, and their information centre could be closed down or denied growth.

In some Western countries there is a trend towards putting a price on information. With the advent of computer services and cut backs in library budgets many libraries have had to adopt a policy of costrecovery for some services. In our country we have not seen this trend yet, but may be we can introduce charge to outside users. Formulae for calculating charges may include factors as research time, online charge, equipment and overheads.

During the course of Convention you will have a chance to listen to number of experts in the field who will enlighten the participants with their rich experiences and would be glad to answer questions you would like to ask. On behalf of the Executive Committee of Government of India Librarians Association and on my own behalf, I wish all delegates a fruitful professional experience.

Thanking you,

INAUGURAL ADDRESS
BY
SHRI SAGAR CHAND NAYYAR
EDUCATION MINISTER, HIMACHAL PRADESH

Ladies and Gentlemen:

It gives me immense pleasure to be with you today and I congratulate Government of India Librarians Association for holding its 6th All India Library Convention here for the first time. I am happy that your Association will focus attention on The Challenges of New Technologies with sub themes New Roles and New Goals for Information Handlers, Future Competencies needed for Library/Information Science Professionals in this convention. The vast explosion of knowledge in all disciplines have brought change in the concept of Libraries. Now Libraries have become information centres, charged with the function to disseminate the knowledge on a wide variety of subjects. Since many new developments have taken place in the Library scene with the advent and application of information technology viz., computers, automation, audiovisuals, microforms etc. It is essential that a detailed discussion should take place at the national level. I hope this convention will help in giving impetus to Library movement in Himachal Pradesh and the country.

We are on the threshold of launching implementation of new educational policy in India. We have chalked out many plans and programmes to make education more effective useful and result oriented for the common masses. Information, as you know is the basic ingredient of education. It is considered to be a basic resource for national development. With the exalating cost of information material and the low purchasing power of the common man, libraries remain the most important source of information. There is obviously close relationship between library development, on the one hand and book development, the adult literary programme, development of formal and nonformal education programmes and reading habits on the other. As we know, the education cannot function in isolation, without adequate support from libraries. The libraries play an important role in the entire education system. Libraries are, therefore, sine qua non for the New Educational Policy.

Development of Library service still continue to be state subject. At the State level too, the main problems being faced are shortage of funds, lack of direction, guidance and coordination, shortage of space, equipment, reading material, uniform book purchase procedure and trained manpower, and an inadequate administrative and supervising infrastructure at all levels. I feel without looking into these basic problems qualitative improvement of education is not possible. It is, therefore, optly pointed out in the National Book Policy Document that a book environment is necessary condition of learning. Likewise in the national education policy enough emphasis has been laid on low priced books, easy accessibility to books, quality of books and promotion of reading habit.

The existing state of affair in our libraries is far from satisfactory. We hardly spend 2 paise per capita on public library services. Hardly 5 per cent of our villages have some sort of a reading room. School libraries are yet to receive the attention these deserve. There is no national or state agency charged with the responsibility of organising and financing school libraries. Very little sustained efforts were made in the past to improve library services and encourage reading habits among literate section of society. Within the limited resources at our disposal, the Himachal Pradesh Government has initiated number of measures to ensure better provision of Library facilities in the rural areas to cover up past deficiencies. Efforts are afoot to plan, organise and equip the existing public libraries in the rural areas. For this purpose we spent 7 lakhs for the improvement of existing public and school Libraries last year and we have again earmarked similar fund for the improvement of library facilities in the rural area this year. In this efforts, we have received enormous support from the Raja Rammohan Roy Library Foundation, Calcutta. We propose to declare all High and Higher Secondary Schools in the State as Public Libraries to offer library facilities to the local community in an organised manner.

Besides, we have prepared a Library Legislation to organise Library services in the State effectively.

It is recognised on all sides that the existing machinery and measures are not enough for the development of an adequate network of public libraries in the country. Adequate administrative, legislative and financial steps are being taken to put the library services on a healthy and sound founding.

It is to be hoped that the existing schemes of Library development both at the centre and in the States will be stepped up and new Schemes initiated in the Seventh Plan so as to lay the foundation for launching a Library Movement in the country.

Ladies and Gentlemen, I have now great pleasure in inaugurating this Convention.

SIXTH
ALL INDIA LIBRARY CONVENTION
SHIMLA
SEPTEMBER 1-4, 1986

The 6th All India Library convention of GILA was held from September 1-4, 1986 at Grand Hotel Simla. The convention consisted of an inaugural session, four technical sessions of seminar and the concluding session.

INAUGURAL SESSION

The convention was inaugurated on the morning of Ist September 1986. Mr. N.K. Gupta, Librarian Medical College Shimla welcomed the delegates in the capital city of Himachal and stressed the importance of holding the convention at Shimla which will infuse Library Activities in Himachal Pradesh. The inaugural function started with Saraswati Vandna by the Children of Central School Shimla. Inaugural address was given by Shri Sagar Chand Nayyar Education Minister, Himachal Pradesh. Shri Nayyar congratulated GILA for holding the convention in Himachal Pradesh and focusing attention on theme "The challenges of New Technologies' with sub theme, New roles and new goals for information handlers, future competencies model for library/information science professionals. He highlighted the change in the concept of libraries due to vast explosion of knowledge in all disciplines and with the advent and application of information technology viz., Computers, automation, audiovisuals, microforms etc. He emphasised the important role played by the libraries in the education system. He spelled out the measures initiated by Himachal Pradesh Government to ensure better provisions of library facilities in the rural areas and hoped this convention will help in giving impetus to library movement in Himachal Pradesh and the country.

Shri V.S. Chauhan from Indian Institute of Advanced Study Shimla gave the welcome address highlighting the use of new technologies at various levels.

A number of messages were received from various dignitaries on the occasion of holding GILA's 6th All India Library Convention. Shri O.S. Sachdeva Secretary GILA read out these messages of good wishes and success.

Shri M.K. Jain, President of GILA in his presidential address highlighted the use of computers in Science & Technology Libraries. He stressed the optimum use of new technologies, microforms, videotechnology, reprography etc. He highlighted the success of the tour of Indian Librarians, Documentatists and Information Scientists to the Libraries, Documentation Centres and Information Centres of Thailand, Malaysia and Singapore. In his presidential address he mentioned that GILA was formed in 1933 at Shimla.

Shri R.D. Gupta Librarian, Ministry of Finance was presented a memento for rendering useful service to the profession and GILA.

Indian Library Movement Award Committee presented its award to Shri M.K. Jain, Director Planning Commission Library and to Prof. (Mrs.) Margaret Chatterjee Director, Indian Institute of Advanced Study Shimla.

Shri V.S. Chauhan from Indian Institute of Advanced Study proposed a vote of thanks.

TECHNICAL SESSIONS

There were Ten papers contributed to the Seminar out of which Eight papers were contributed to the main theme. The challenges of New Technologies and two as background papers. The main theme the challenges of New Technologies was divided into the following four technical sessions:

1. Technical Session I: Computers in Library & Information centres.
2. Technical Session II: Technologies for information processing and Dissemination.
3. Technical Session III: Challenge of New Information Technology.
4. Technical Session IV: Impact of information technology & Electronics publishing on libraries and information services.

TECHNICAL SESSION I

Theme: The Challenges of New Technologies

Director: Prof. P.B. Mangla

Rapporteur General: Mr. S.N. Mehta
Rapporteurs : Mr. N.K. Bhatnagar
Mr. B.K. Verma

Chairman's Introductory Remarks:

There were two papers presented in this session. Prof. P.B. Mangla in his introductory remarks commended the relevance of the theme to the present day. The developments in Science and Technology in all fields are so rapid and amazing that their applications appear like fairytales. Similar is the situation of technological advancements in the field of Information Sciences. Although librarians are not responsible for such advancements, but they can and must make use of those available facilities to meet the challenges in the field of Information dissemination in most suitable manner. Presently, these things have become part of the system in developed countries, then why should we lag behind in this race. It is satisfying that we too have many bright spots like NIC, INSDOC, DESIDOC, etc. The seminar and conventions like the present one are best forums to think of utilizing these. As regards the Government support, a committee consisting of 23 members has already been appointed to look into the development of libraries.

The first paper of the session was by Dr. P.S.G. Kumar, Head, Department of Library & Information Science, Nagpur University entitled "Computerization in the Library Context, A study of the Indian Scene". In the absence of the author, the paper was read in full text by Mr. T.D. Ghuliani. The paper elaborated India's capabilaities in computer, communication, reprography and micrographic technologies and their impact on Indian Libraries. It also gave an abstract of the Library systems developed by Indian Libraries. While discussing details regarding hardware, software, etc. of the indigenous systems, it also touched upon external environment, the library situation, attitude of the Government etc. The paper concluded by giving a set of suggestions for those who wish to embark upon automation.

The second paper, entitled "Computers in Information Centres in India: Status Report" was by Mr. S.P. Agrawal and Mr. Manohar Lal of S.S.D.C., New Delhi was read in full text by Mr. Harbhajan Singh of Central Water Commission due to the absence of both authors. The paper presented a brief review of current activities and future projections of computer applications in libraries and documentation/information centres in India. Besides giving highlights about the computerization of bibliographic process in several documentation centres since 1964, the authors also identified the prohibitive factors and suggested the necessary remedial measures.

Discussion

As author of both papers were not present so there was no question-answer session. Alternatively the Chairman suggested to hear those from amongst the audience, who have practical experience of computer usage. The idea was appreciated by all and the first speaker was Mr. V.K. Rangra Dy Director DESIDOC Delhi.

Mr. V.K. Rangra felt that the authors of both the papers presented in this session have almost ignored the role of DESIDOC as an agency having automatic information management system on a national level, although they had identified several other institutions Mr. Rangra informed the audience about the problems they faced in the beginning and how they progressed gradually upto the present day level when they are bringing out monthly accession, keeping circulation control of 5-6 institutions on campus as well as 10-12 labs in Delhi, having their own SDI system, and to assess the suitability of projects with the help of DIALOGUE international system to name a few of the several activities.

Mr. S.N. Mehta, Dy. Director DESIDOC then supplemented the information provided by Mr. Rangra by informing that computers are also being used in DESIDOC to maintain Union Catalogue of periodical holdings of all DRDO labs besides the Union Catalogue of Patents held in DRDO Labs/Estts in the country.

Mr. S.S. Murthy, Director DESIDOC made a couple of observations. For example, in the Ist paper, on page 3 subheading 25, he felt that the line printer was not perhaps the most widely used output device but a dot matrix printer is more common. The common line printer used by India normally are of the speed of about 50 characters per second (CPS). Similarly in the 2nd paper on page 15 forthe statement made in para that Computer Maintenance Corporation Hyderabad have manufactured multilingual computers, it was observed that CMC donot manufacture computers, but develop the software and look after the maintenance of computers. They have recently started import of computers in large number for supply to Government organisations in the country.

Mr. Satinder Singh (Distt. Library, Bilaspur) said there is a general phobia among the masses about the unemployment that might be generated by switching over to computerization.

Mr. Jitendra Varma (J.N.U. Delhi) observed most of the librarians are unable to accept the computers due to (i) lack of basic knowledge and (ii) the costfactors. It is ironical that normally the knowledgeable colleagues are not willing to impart their experience and knowledge to others. As a remedy, some agencies like NIC, etc. should take a lead by providing free software as well as short term training to use them. It is an encouraging sign that the cost of computerization is coming down considerably day by day, e.g. Rs. 1.5 lakhs are sufficient to computerise some activities of house jobs through minicomputers. The manufacturers themselves provide free training to the buyers. The only thing is the enthusiasm to be developed, one M. Phil student in J.N.U., as part of his M.Phil dissertation, prepared an excellent software programme for libraries, but no body has so far made use of it.

Shri Ram Bhagat Singh (Haryana Agriculture University Library) told that in absence of will power many libraries are not in a position to install a computer. So will power is very necessary.

Mr. Garg (Shimla) said Prof. Mangla has just now suggested that every library should not go, as fashion, for computers, Even a reprography machine can serve the purpose of information dissemination if one uses discretely. Will he further elaborate on it?

Prof. P.B. Mangla replied that our main objective is to disseminate the available information to users in an effective manner. This can be achieved not only by computers but also by several cheaper conventional gadgets like photocopiers, cyclostyling machines, microfilm readers, radio TVtape recorders and even the low-cost Audio Visual aids like posters, etc. in case of smaller libraries.

Mr. Nasib Chand said when we know that the computers have to come in a big way in almost all spheres of activities, including the information management. Whether we like or not, then why should we not welcome this new technology? For this purpose, small manuals may be prepared about the utility of computers and distributed in order to convince the authorities. The library staff should be adequately trained and directories of the experts in computer technology should be prepared so as to seek guidance and advice, if desired.

Mr. Balbir Singh remarked that GILA in cooperation with the Planning Commission had organised two computer courses.Similar courses should be organised by other agencies also.

Mr. Singh (Delhi) added that these courses should preferably be on Sundays/holidays so that there is no disturbance in the routine job of the libraries.

Mr. S.S. Murthy, Director DESIDOC said I would like to correct the second speaker Mr. Varma regarding the cost of computerization. A mini computer costs at least Rs. 5 Lakhs with configuration to information retrieval functions not Rs. 1.5 Lakhs as stated by him. However, software packages can be had for cheaper prices. These have been developed by many agencies but, unfortunately, there is no openness. A sort of secrecy is maintained by several programmers. The BHEL (R&D Division) had procured a software for acquisition work for less than $ 150. Several journals like PROGRAM, DATA BASE etc. give advertisement regarding availability and cost of softwares. As regards the training, NISSAT in collaboration with the Jadavpur University, and TIFR are also planning to start some training courses for librarians.

Mr. Tapan Sarkar, (Gazetted Officers' Association) narrated DRTC has already started 6 weeks training programme although their selection is very tough. Six persons have been trained in the staff of the National Library, who in turn will train other staffmembers.

Mr. V.S. Chauhan, (Shimla) pointed out that there is no complete plans from the Government to computerise the different types of libraries in H.P. There should be a plan and in this regard library staff should be trained properly.

CHAIRMAN's CONCLUDING REMARKS

Prof. P.B. Mangla said the committee of the National Policy on Libraries & Information System has expressed in chapter V of its report the need to develop national information networks. The new education policy has also incorporated on our initiation, one para about the libraries. We should resolve to have continuing education programmes for librarians on regional and national level. With these remarks of the chairman the session came to an end.

TECHNICAL SESSION II

Theme: Technologies for Information Processing and Dissemination

Director: **Prof. P.B. Mangla**

Rapporteur General: **Mr. S.N. Mehta**
Rapporteurs: Mr. S.P. Kulshrestha
Mr. B.K. Varma

The Chairman invited the first speaker **Mr. S.S. Murthy**, Director, DESIDOC to present his paper.

The title of Mr. Murthy's paper was "Technologies for Information Processing and Dissemination". He did not read his paper saying that the first part of his paper gives background information, but the main thing to stress upon is the concluding part, i.e. the future scenario. Presently, the CAS/SDI Services offered by the libraries have normally three phases: (i) Bibliographical service (ii) Abstracting Service, and (iii) Information Digests Service. The database thus prepared can be stored and retrieved by computers. Today, there are so many databases in the world on all subject fields that even directories of these data bases have been prepared for their identification. This is one area of computerization, i.e. to make use of these international databases.

The second one is the telecommunication aspect based on the "Online System". This area is going to dominate over others. DESIDOC has been carrying out searches for DIALOG, although the hotline maintenance charges are enormous (approx. Rs.25 lakhs/annum) besides the search charges. In order to cope with the fast pace of technological developments, we should understand the hardware & software technologies, otherwise the computer people will take over from the librarians. The third aspect is that the microforms/optical discs/CD-ROM will eliminate the currently used microfilms, etc. The photocopiers microfilm readers, typesetting machines can now be hooked with computers to give much better and faster results. With the revolutionary changes taking place in electronic technology, by the turn of the century, we can envisage the following scene to emerge in the information field: Libraries would shrink in physical size, although, the hard paper material as well as the microfilms, discs, etc. will coexist, information transfer world wide will be by satellites, there will be portable libraries, paperless offices, and so on. In order to get a team of future librarians ready to meet these challenges, the universities should reshape their curriculum.

DISCUSSION

After presentation, the paper was open for discussion.

Mr. **V.S. Chauhan** (Shimla) what about the small libraries or public libraries? Whether archival collections can be replaced by paperless materials?

Prof. P.B. Mangla:. I fully agree with Mr. Murthy that the curriculum should be revised and improved. Some Universities have started thinking although many are still unwilling to accept the change in these terms. But the irony of the situation is that they try to look at the moon not on the earth. They talk about information, not of the libraries, while the word "Library" is still very much valid even today. The compromise term may be "Library and Information Service". But the practical problem is that for teaching purposes, we have experts either in Library Science or in Computer Science, not the hybrid of the two. The computer men do not stay with us for long as they are rare, costly and much-in-demand commodity.

Mr. Surinder Singh: Untill there is development, upto grassroot level, there is no point in talking about computerization.

Prof. P.B. Mangla: It is true that only 5 states so far have library legistlation. But, it is a subject of states. But , till we have library legislation in all the states. It is automony of the states central Government cannot interfere in it. The fact is that the states give lowest priorities to libraries.

Mr. Joshi (NITIE, Bombay), Why can't there be a library person as a liaison between centre and the states? The Associations should come forward to provide awareness training to the librarians.

Mr. Nasib Chand, Prof. Mangla being in Delhi should initiate such training programmes. Then others will also follow. The seniors should come forward to lead the juniors. There should be a national Institute of Training in Library & Information Science and then similar refined Institutes may also be established.

After this discussion there was the turn of the second paper by (Mrs.) **Shyamali Mukherjee** (Dte of Plant Projection, Faridabad) entitled "Challenges of New Technology". As the author was not present, the conclusion part of the paper was read by Mr. Varma (JNU). Then the paper was open for discussion.

Discussion

Mr. Somesh Sharma (District Library Mandi): There should be some refresher courses for the existing librarians otherwise how we are supposed to implement the new technologies.

Prof. P.B. Mangla: The need of a national institute for training and research in Library & Information Science has been emphasized in both the documents of planning commission as well as that of the Education policy submitted to the Government of India. The present GILA Convention should send a resolution to implement it. I shall see for the continuing education.

Thereafter, the session was declared as closed.

TECHNICAL SESSION III

Theme: Challenge of New Information Technology

Director: **Mr. S.S. Murthy**

Rapporteur General: **Mr. S.N. Mehta**

Rapporteurs : **Mr. Vajendra Joshi**
: **Mr. Bhagat Ram Singh**

CHAIRMAN's INTRODUCTORY REMARKS

The Chairman commented that the two papers coming under discussion are covering overlapping aspects of the Information Technology from different angle.

The first paper of the session was by Mrs. **P.G. Joshi** and titled "Impacts of new technologies on Information Industry", author highlighted the various points as follows:

The term 'Information Industry is used in a limited context of librarianship. This paper traced the history of communication process, media and the growth of literature and indicated the need of new technology to handle the vast literature growth. While identifying the three major trends which helped in handling information explosion. The trends being (1) recognition of information as resource (2) Concept of resource sharing (3) The advances in Information Technology. The author elaborated the new recording media like microforms, perforated media, magnetic media and brought forth the impact of the change in recording media on librarianship and user community, and how the three technologies computing, microelectronics and communication technology has revolutionised the organisation of Library & Information Centres. The author foresees the coming of 'Paper less Society and concluded that the concept of Libraries without Wall' still remains a far reaching cry.

Mrs. **Joshi** also informed that she is conducting courses in computer application for Libraries at her Institute "National Institute for Training in Industrial Engineering", Bombay.

Discussion

Mr. **S.S. Murthy**: What are the accommodation facilities and the software?

Mrs. **Joshi** replied that accommodation facility is available at the Institute for trainees. She also replied to Mr. Murthy's question that the software developed by her are compatable to IBMPC's which have D Base II facility.

Mr. **S.S. Murthy** commented that the questions asked for any training programme director is, will the training of short duration give the confidence to handle the technology? He said the answer is yes and no.

He suggested that before taking up training, the trainees should do some Homework. He also said that efforts from his side are being made to throw open the DESIDOC training facility to other than defence personnel.

The second paper for the session was of Mr. **Prakash Chand** and **Hukam Singh** entitled the challenge of new Information Technology. As authors were not present, Mr. Varma, JNU, New Delhi read the conclusion.

The paper dealt with the capabilities, characteristics factors involved in adoption of new Information Technology and possible problems which may encounter in adoption of it. Features like feasibility convenience, comprehensiveness and cost have been analysed.

Discussion

There were no question.

Chairman's Concluding Remarks

The Chairman emphasised the need for courage in facing the new technology and assumed that, it is not difficult task to adopt to Library situation. He also suggested some literature for librarians to start with and he said he will provide the necessary reading list on request.

The Chairman concluded the session, thanking GILA for providing him an opportunity to preside over the session.

TECHNICAL SESSION IV

Theme: Impact of Information Technology & Electronics Publishing on Libraries and Information Services

Director : **S.S. Murthy**

Rapporteur General : **Mr. S.N. Mehta**
Rapporteur : **Mr. J.P. Singh**

The following two papers were presented in this last technical session:

1. Information technology and its impact on library and information services by Sube Singh

2. Impact of electronic publishing on libraries and information services by B.L. Koli, Hans Raj & Ram Kumar.

Mr. Sube Singh in his paper highlighted components of information technology, computers and their use in libraries, word processors and their use in libraries, computer networks and data-base, Reprographic service and document library. The impact of microforms, Developments in Communication Technology and Indian National Centre for ISDS at INSDOC. The author suggests the librarians and information professionals should keep pace with new developments in information technologies and face them boldly for the benefit of the country.

Discussion

Mr. **S.S. Murthy**, Director DESIDOC commenting on his paper suggested that the Academic librarians should go to some advanced libraries to see that how they are using information technology in the library and information services. He motivated the academic librarians to come forward and accept this task as challenge and start work with the guidance of some advanced libraries. Mr. **D.S. Varma** pointed out the problem faced by the Government College Librarians regarding paucity of space, lack of staff etc. He also raised a point that in stock verification every year library is loosing 500 books and exemption limit of bearing the loss by the college is very less and librarians will have to pay from his pocket.

Mr. **Jatender Varma** (JNU New Delhi) suggested that the GILA should formulate a staff formula for college libraries because the existing staff formulae are not fit for the college libraries.

Mr. **V.K. Rangra**, Dy. Director DESIDOC recommended a staff formula for the special libraries keeping the following four points in view:

(i) Library Services i.e. Circulation etc.
(ii) Indexing, Abstracting etc.
(iii) Translation
(iv) Reprographic Services.

Mr. **M.K. Jain**, President, GILA informed that for the circulation of books the loss of 3 books can be borne by the college library. Library items are separated from the store of items: No tenders are needed to procure books

Mr. **Jatender Verma** (JNU) suggested the academic librarian to make a feasibility report regarding computerization i.e. choose the areas in which the library functions can be computerized and this report should be prepared by the library professionals. Then hardware aspect, means the type of technology (type of computer and peripheral equipments).

Software is another important factor for automation work. He also suggested that the library can develop in house program or can purchase software packages available in the open market depending upon the library circumstances and staff. After considering the above three factors library can implement the computerized process in the library.

The second paper Impact of Electronic Publishing on Libraries and Information Services by B.L. Kohli, Hans Raj and Ram Kumar was presented by Mr. Bhardwaj

Discussion

Mr. **S.S. Murthy**, Chairman commented that the paper is quite different from the other papers and focuses towards electronic publishing not the library computerisation. Here the author has not given his own observation and idea but discussed the equipments used for the electronic publishing. No comment from delegates side.

Mr. **V.K. Rangra** discussed about New Roles of Librarianship/Information Handlers in the Changing Technology.

Concluding the session all professionals were agreed to implement the computer technology in the library keeping the advantages in view that it gives accuracy in work, saves the time and it easily manipulate the data within a very short period of time.

CONCLUDING SESSION

Director : Mr. **M.K. Jain**

Rapporteur General : **Mr. S.N. Mehta**

Rapporteur Mr. **J.P. Singh**

From the papers, the discussions that followed and the observations of the Directors of the various technical sessions the following recommendations emerged:

RECOMMENDATIONS

1) It is recommended that we must have a continuing education programmes at regional and national level which should not only be theoretical but practical one, both for practising librarians and teachers.

2) It is recommended that the policy document submitted by the committee should be immediately looked into it and steps taken by the Government to implement it.

3) It is recommended that the library school should have teacher in information science.

4) Experts from foreign countries should be invited to supplement what we clearly know.

5) The information regarding training programmes in application of Information Technology be widely disseminated through professional publications such as GILA Bulletin.

6) It is recommended that the top level professionals should motivate the subordinate staff to accept the new challenge in this field, specially youngesters. Because the new generation can implement the latest developed technologies in the information field easily.

7) The bigger departmental and other libraries and the Government of India should take immediate steps,. for the use of computer technology for coordination & quick SDI.

8) Reprographic facilities should be provided in all libraries.

ILM Award Ceremony, Shimla

The International Library Movement Award Ceremony was held at the Grand Hotel,Simla (H.P) on 1.9.86.Shri Nasib Chand, announced the selection of awardees and gave the introduction and policy of ILM Awards. Shri Sagar Chand Nayyar, Minister of Education, Govt. of Himachal Pradesh, presented the ILM Award 1986. (Medal and Citation with the title of Surya to Prof (Mrs) Margaret Chatterjee,Director, Indian Institute of Advanced Study, Shimla and Shri M.K.Jain Director,(Library and Documentation) Planning Commission, New Delhi for their contribution towards Scientific Research and Education.

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COMPUTERIZED INFORMATION SYSTEM FOR WATER RESOURCES DATA

A computerized integrated information system s proposed to become operational shortly o modernize methods of information storage and retrieval of data regarding water resources. This will fulfil the need of scientists and engineers for access to a wider range of technical information and its quick dissemination. It has been necessitated by the rapid development of the conservation and distribution of water resources, flood control and drainage and priority activities of the Govt.

This information system is part of a UNESCO/UNDP aided project "Water and Power Information System" set up in 1982. The project is supporting the Central Water and Power Research Station and Central Board of Irrigation and Power and Central Water Commission in organising and building up technical information systems and the eventual establishment of a national information system. Presently the project, besides normal library services, offers complete range of microfilming services including copying of documents on 16 mm and also provide photostat copies from these microforms.
The Project is equipped to disseminate information to the users all over the country and to exchange documents in a variety of forms amongst the various institutions and libraries both in and outside the country. This increased interaction between the national and international level would lead to further development in giving emphasis for growing competence and cooperation in the areas of information science.

Other means of exchanging information would be through the use of Fascimile, Video conferencing, Electronic Mail, Videotext/Teletext systems, etc."

SHRI VENGALA RAO INAUGURATES TECHNOLOGY BANK

Shri J. Vengala Rao, Union Minister for Industry, inaugurated the Computerised Technology Bank set up by National Small Industries Corporation for storage and dissemination of information on the technologies and technical processes available for small scale industries at the NSIC Pavilion in Pragati Maidan.

The primary objective of the Technology Bank is to provide information on various small industrial projects and also to produce project profiles for use by entrepreneurs both within the country and abroad. This Bank would prove to be of immense use in providing information to the entrepreneurs in other developing countries to whom NSIC is providing a package of services, including projects on turnkey basis. The Minister showed keen interest in the Technology Show which has been put up in the Pavilion.

The delegates of the recently concluded Afro Asian Industrial Cooperation visited the NSIC Pavilion at Pragati Maidan and showed keen interest in the Indian technologies.

ACHIEVEMENTS OF FRANKFURT BOOK FAIR

Shri P.V. Narasimha Rao, Minister for Human Resource Development has in a written reply to a question in Rajya Sabha informed the House that the Frankfurt Book Fair-1986 has been a very successful event. The focal theme of the Book Fair was 'India-Change in Continuity'.

Shri Rao further informed the House that the Indian publishing industry received unparalleld exposure among readers, scholars, librarians, journalists, publishers, book sellers and printers of the world. It is too early to assess total commercial benefits, as final settlement of trade terms, royalty, copyright permissions, etc. takes time. A large number of business meetings were held between the foreign buyers and private publishers and members of the Indian delegation. From the preliminary reports received from officials and some leading publishers, it is estimated that orders worth about Rs.25 lakhs covering about 7,000 titles were booked and preliminary agreements for translation/reprint rights of about 40 titles were negotiated.

Details of the number of Indian books displayed are as under :

Books displayed at exhibition printed and published in India by the Frankfurt Book Authority	--	5852
Journals displayed by the Frankfurt Book Fair Authority	--	484
Books displayed at the stands hired by National Book Trust	--	731
Books displayed at the Stands hired by private publishers	--	3500 (approx.)

Composition of the delegation to the Fair was as under :-

Officials	--	6
Officials from autonomous bodies	--	7
Authors invited by Frankfurt Book Fair Authority at their expense	--	25
Printers and publishers for whom Govt recommended release of foreign exchange	-	68

Training Programme on the 'Application of Computer to Library & Information Work

23 June - 1 July 1986

This was the third training programme on the subject , organised by DESIDOC at its premises in Delhi. Twentyfour information personnel from the DRDO Estts/Labs and the Ministry of Defence Public Undertakings participated in the programee.

Shri S.S. Murthy, Director, DESIDOC welcomed the guests and the participants and explained the objectives of the training programme.

Dr. A. Lahiri Director, NISSAT in his inaugural address said that we were not able to attract computer experts to the library profession. It is, therefore, advisable that the library professionals be trained in computerisation. He appreciated the efforts made by DESIDOC to organise short-term courses like this, which enable the persons to understand the machine and work on it more efficiently. Dr Lahiri advised DESIDOC, to organise a course, spread over a year, which may give more depth to the subject.

Shri Ambrish Kumar, Course Coordinator explained the features of the course which he said, had the judicious combination of lectures and practical training on the computer.

Prof. P.B. Mangla, Head of the Dept of Library & Information Science, University of Delhi who presided over the function, referred to the working group on the modernisation of libraries and informatics formed by the Planning Commission for framing recommendations for the Seventh Plan. The group, of which Prof. Mangla was the member secretary emphaized the need for using computers and to identify certain libraries which may be provided with necessary facilities. He further said that there was necessity of inducting right type of manpower to act as catalyst for promoting computerisation. Prof. Mangla pointed out the inadequate coverage of computerisation in the University curriculum and the lack of competent teachers. He referred to DESIDOC as a bright spot where knowledge of computerisation is put to practice. Prof. Mangla hoped that within the next five years, quite a few information centres will emerge as model centres and in this regard, DESIDOC will play a dominant role. Shri V.K. Rangra Scientist I/C Training proposed a vote of thanks.

The course content included input preparation, data entry, file creation, construction of user profile, use of microprocessor system, data base searching, computerised serial control /accession list/circulation control. Special lectures were delivered on word processors, d Base II, on-line data bases. Practical training was conducted on microprocessor systems an the main frame PRIME-750.

The participants in their feedback made som useful suggestions. Shri S.S. Murthy, Directo DESIDOC delivered the valedictory address an gave away the certificates.

TRAINING COURSE ON SCIENTIFIC PHOTOGRAPHY

The course was held on 6-17 Oct.1986 a DESIDOC, Delhi, Sixteen trainees depute by different DRDO Estts/Labs an Ministry of Defence Public Undertaking participated. The course was inaugurate by Shri S.S.Murthy,Director DESIDOC, wh in his address emphasized the importanc of photography in information pro cessing, storage and dissemination.

The course was of advanced level and th participants were professional photo graphers with experience. The curriculu included topics on B/W & Color photo graphy, portraiture, processing of colo films, pitfalls in processing, lightin equipment, Agfa color materials & equip ment and special lectures o reprography, microform, industria photography etc. The faculty comprise well-known experts in photography suc as S/Shri T.Kasinath, O.P.Sharma K.Ponnuswamy, P.T.Bhopale, R.K.Bose besides some DESIDOC officers.

The valedictory address was given b Shri Vivek R.Sinha,Additional Secreta Defence Research,who appreciated th efforts of DESIDOC in organising such course. Shri Sinha emphasized th necessity of a manual on preparation o slides, so that some uniformity may b maintained in the slides which the DRD Directors often have to use to mak presentations at the HQrs or elsewhere The programme ended with a vote o thanks by Shri V.K.Rangra Scientist I/ Training.

Shri P.V.Rao, Scientist I/C Reprograph was the Course Coordinator.

LECTURES

1. Shri V.K.Rangra Scientist ´E DESIDOC delivered the followin lectures at the Deptt of Library Information Science, Gulbarga Unive sity, Gulbarga on 1 Oct.1986:

   i)Staff Formula for the Libraries
   ii)Information Technology:An overvi Prof.S R Gunjal,Head of the Deptt.w in the Chair.

VISIT TO DESIDOC

The following visited DESIDOC:

1) The participants attending the International Training Programme on Information Storage & Retrieval System conducted by the National Institute of Small Industry Extension Training (NISIET), Hyderabad, under the leadership of Mrs.K.Subhashini Reddy, the Course Director visited on 15 Oct 1986.
2) Ms.Harriat Ostberg, Library Scientist of the University of Lund, Sweden, visited on 21 Oct 1986.
3) A group of senior professionals of IIT Delhi Library visited on 23 Oct 1986.

The visitors were briefed about the functions and activities of DESIDOC and were taken around the Library and Computerisation of Information Division. A demonstration was given on the various computer-based information systems & library operations developed by DESIDOC.

1. Shri S S Murthy, Director, DESIDOC participated in the 43rd Conference and Congress of the International Federation for Documentation (FID) held at Montreal, Canada during 14-18 September, 1986 and presented a paper titled "An Overview of the Development of Bibliographic Information Processing Technologies in India".

   He also represented the Indian National member of FID in its General Assembly meeting held during 12-13 September ´86.

2. Shri S S Murthy, Director, DESIDOC was invited by the Indian Petrochemicals Corporation Limited (IPCL), Research Centre, Baroda during 6-7 November, 1986. During his visit to the IPCL he delivered a talk on "Trends in Information Technologies" and also rendered advice on organisations of scientific information services in the company.

PEOPLE IN THE NEWS

Shri M.K.Jain, Director (Liby & Doc), Planning Commission, New Delhi, retired from the post on 31st Oct 1986. Shri Jain has been appointed Consultant in the Planning Commission with effect from Ist Nov.1986.

Shri T.S.Rajagopalan, Scientist in charge and Head of INSDOC, New Delhi, retired from the post on 31st Oct.1986.

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पुस्तकालय
गुरुकुल कांगड़ी विश्वविद्यालय
हरिद्वार

By Promilla Kalhan

OVER 300 regular visitors to a centrally situated library in New Delhi made written representations to the Union Ministry of Information and Broadcsting not to close it down. That was almost a year ago when rumours were afloat that the library and information centres run by the Press Information Bureau was going to be closed for good. The visitors include students, working people, teachers and other professionals, retired persons and job-seekers. The library to many is the place where they can read newspapers and journals they cannot afford to buy even if the books are old and rare rather than contemporary. Research scholars, however, find them invaluable.

The I and B Ministry's library and Information Centre in Connaught Circus is to be shut down at the end of this month. Letters to the Ministry, the Lok Sabha member from New Delhi and even the prime Minister have brought not as much an acknowledgement. In desperation one library regular, an engineer, has sent an appeal to the President.

According to an I and B Ministry spokesman, the library is being shut down because it is considered "irrelevant" in the present day context when other libraries have come up. The spokesman, however, admits that according to information available to him the centre is being well used and is visited by a large member of readers. He has not, however, visited it in the recent past.

The library centre, set up over 25 years ago, has eight rooms and several halls. Over 300 chairs are stacked in one of the halls. In days gone by documentary and feature films used to be screened there for special invitees and also members of the public.

The I and B Ministry's contention that its information centre and library has become "irrelevant' is far from correct. There is no other public reading room, properly speaking, of its kind in New Delhi. It is the only one which gets newspapers from all the states, not merely the national dailies. It is the only one which gets most of the Indian journals and magazines, including those produced by the Government of India and the state governments. The centre also subscribes to standard foreign magazines.

Library facilities in Delhi and New Delhi are limited. For the serious students the Central Secretariat Library could be a boon. But its membership is restricted largely to government employees. Out of the 2.5 million government servants just 14,000 are its members. Asked why the number was so small the Director of the Central Secretariat Library said that "government servants don't read!" The library has a fine collection of 700,000 volumes besides microfilms. It has a comprehensive collection of reports poduced both by the centre and the State governments. It also subscribes to professional journals. After the National Library in Calcutta this is the second largest in the country but its books mostly lie unused. The public can use its reading rooms which have a seating capacity of 300 but few people know that casual visitors are allowed in. A review committee appointed by the Ministry of Human Resources which controls the library, has suggested that the name of the library should be changed as also the working hours. At present it functions between 8 a.m. and 6p.m. and like all government offices is closed on Saturdays and Sundays. There is a suggestion that the more popular type of books with the library might be earmarked for the reading public and perhaps transferred to the Delhi Public Library.

The Chairman of the Delhi Public Library, Dr D. N. Panigrahi (who is also the Director of the Parliament Library) says that the general public is hungry for books, newspapers and journals. Visit any reading room during the earlier morning hours and [illegible] packed to capacity. This is not surprising because few people can afford to buy even one daily newspaper. The Delhi Public Library has 60 branches besides some mobile vans. The total number of books with it is one million. Some of the 60 branches consist of just one small room and a few score books and no newspapers.

The Delhi Public Library does not go in for text books or technical books. But due to a constant demand some technical books have been acquired for one of its branches. The demand came mostly from readers in the 25 and above age group who want to improve their career prospects and cannot pay the prohibitive price of technical books. The Delhi Public Library has many offers of plots of land as donations for the setting up of libraries. It has acquired four plots for the purpose, one each in Janakpuri, R. K. Puram, Rajouri

Garden and Parpatganj. It hopes to construct library buildings there in the next three to five years. Its proposal to DDA that every new colony should have a library room earmarked even in the market complex if not separately,has so far fallen on deaf ears. in fact the library's Chairman wants to keep some of the branches which attract a large number of readers, open round the clock. "Students might want to read late into the night and senior citizens out on early mornin walks might want to spend an hour reading", he adds. He looks upon libraries as centres of non-formal education. Until a few years ago, the Delhi Public Library largely went in for entertainment reading like fiction. But in 1983 it was brought under the Book Delivery Act which means that at least 3,000 new books on different subjects are added to it each year.

Dr Panigrahi is surprised that the I and B Ministry is closing down its information centre and library without first ofering it to the Delhi Public Library which has an ambitious expansion programme. Even at this late stage, he would be happy to take the library over and save it from closure. It is odd that both the I and B Ministry and the Ministry of Human Resources are situated in the same secretariat building — Shastri Bhavan — and yet the latter knows nothing about the former's design of drawing the shutters upon hundreds of readers and denying them access to reading material. The plan to close down the library has evidently been there for over a year but the staff was given notice only a few weeks ago. This was perhaps done to prevent the library's readers from agitating against its closure. Why? One rumour is that LIC which owns the building wants to put the premises to commercial use and get a high rent. Some people can perhaps also corner key money. The common man, after all, is a low priority. Talk of providing reading material to neoliterates and technial reading material to students and professionals to update their knowledge is so much of hot air, readers feel.

Several organisations — The Delhi Public Library, NDMC and the Department of Women in the Ministry of Human Resources are willing to take over and run the library centre considered "irrelevant" by the I and B Ministry. Said the Delhi Public Library Chairman: "No library anywhere in India should be closed down. Even people who are comparatively well-off cannot acquire personal libraries at the present high price of books. The only answer is to have more public libraries and reading rooms."

Mrs Margaret Alva, Minister of State for Women's Affairs hopes to persuade the I and B Minister to hand over the premises to her Department for setting up a documentation entre and organising campaigns for women's welfare. The Women's Department is cut up with Doordarshan because it refuses to allocate prime time for anti-dowry and similar campaigns. According to an officer of the Women's Department "all that Doordarshan is interested in is money therefore commercials are given preference at prime time. We are offered a few seconds at around 11 p.m. which is no use to us."

What will be the consequence of closing down the I and B library and information centre? Readers say some of them may visit the American library. But since it stocks only US publications their purpose will not be served. There are other specialised libraries of use to scholars. They include the British Council Library which charges a yearly subscription and the Nehru Memorial Library where a handful of scholars can work on particular projects. The NDMC has a small library in the old Town Hall but it is meant mainly for its employees. There too there is a clamour for technical books. The Committee makes newspapers and magazines available at its craft centres and reading rooms, wherever space permits. But this activity of the local authority deserves to be enhanced.

A good deal of money is spent on organising **sarkari** culture today. The Sahitya Kala Parishad of Delhi Administration organises festivals of dance, music an theatre. The Indian Council of Cultural Relations has a show on every Saturday and quite often on other days also. Previously private organisations devoted to the arts were active in the field. They were usually supported by the Government. They have now been overshadowed. But neither the Parishad nor the ICCR has thought of subsidising a library movement. So great is the hunger for reading material in Delhi that small pavement book shops serve as lending libraries for journals and paperbacks for a small monthly fee.

(The Hindustan Times, Feb 23,1987)

WITH BEST COMPLIMENTS

FROM

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Conference Reports

Resolutions of the XII National Seminar of IASLIC held at BANARAS HINDU UNIVERSITY during 28-31,December 1986.

1 Recommendation

RECOGNISING the prevailing stringent financial condition and the growing concern of costs accompanied by a tendency to either reduce expenditure or to justify every rupee that is planned to be spent, it is

RECOMMENDED that libraries and information centres adopt programme/ performance budgeting systems-such as, Planning-Programming-Budgeting system and zero base Budgeting-which are output product oriented, for purposes of better management & financial accounting.

2. Recommendation

In view of the fact that there is a general lack in the perception of the economic structure of the library and information systems, it is

RECOMMENDED that libraries and information centres design, implement and operate cost-study programmes such as Cost analysis, Unit costing and timing, Cost-effectiveness and cost-benefit studies-as it would facilitate gaining of managerial strength through greater economic insight and more effective decision-making.

3 Recommendation

RECOGNISING the positive role that can be played by library standards in budgeting and costing of library information centre operations and services, it is

RECOMMENDED that a project for the development of appropriate libraries information centres be undertaken by agencies like ISI,IASLIC,ILA,DRTC,etc keeping in view the existing library standards at the national and international levels in close co-operation.

4 Recommendation

RECOGNISING the importance of modern financial management/cost accounting techniques on the one hand and general lack of adequate knowledge on these techniques among the practising librarians and information scientists, it is

RECOMMENDED that various library and information science schools at the post-graduate level incorporate this subject in the syallabi of their formal regular & continuing education programmes.

5 Recommendation

SINCE cost-benefit analysis is potentially very appropriate to decisions about resource allocation in libraries and information centres, where outputs are not always direct and tangible, it is

RECOMMENDED that CBA studies be undertaken in different types of libraries and information centres with a view to refine this method for facilitating proper application.

6 Recommendation

RECOGNISING the potential of Ratio Analysis Technique as an useful tool for assessing the health of a library, inspite of its limitations, it is

RECOMMENDED that the various libraries and information centres experiment with this technique for assessing quantitative aspects in their respective libraries and also to set standards.

7 Recommendation

RECOGNISING the deficiency in the existing library laws and rules of five states in India, it is

RECOMMENDED that

(1) Mandatory provision for ensuring flow of adequate amount of funds for providing adequate and efficient public library service should be incorporated in the respective Public Libraries Acts by suitably amending them;and

(2) Where Public Acts are not existing (as in the other states), suitable steps should be taken to frame them immediately with suitable mandatory financial provision.

8 Recommendation

The good deal of discussion in the Panel Session on Computer Application in Library and Information Systems realised the need for developing the appropriate knowledge and skill in computer for proper functioning of the Library and Information Systems and

(a) RECOMMENDED that the Library and Information Science Courses in all the Universities should include in their curricula for both B.L.I.Sc. & M.L.I.Sc courses Computer Application in Library and Information work as a compulsory paper.

(b)RECOMMENDED further that Training programmes for the development of the library and information professionals for making them abreast to the current developments in the field be also taken up by DSIR & IASLIC or both in joint collaboration.

Recommendations from Special Interest Group(SIG)Meetings

9 Recommendation

The SIG(Industrial Information) discussed in detail the different aspects of industrial information-its emerging needs in the fast changing society especially in the context of technological changes etc.

RECOMMENDED after duscussing a good deal that:-

(a) There should be an organised Industrial Information Data Bank at national level with distributed information systems in industries for easy accessibility and availability of timely and appropriate data information for effective management of industry.

(b) There being dearth of information manpower suitable for handling and managing industrial information which is a distinctive category,IASLIC should start imparting short-term training programme for industrial information.

SIG (Humanities Information)

10 Recommendation

Realising that there is hardly any comprehensive bibliographic control in the field of humanities, it is

RECOMMENDED that both the Central and State Governments be urged upon to augment the infrastructure, in national, state, literary academies and other organisations dealing with the various disciplines falling under humanities and to set up suitable Data Banks for comprehensive bibliographic control in their respective disciplines

RECOMMENDED further that a national body with representation from IASLIC and other professional bodies at national level be set up to plan, co-ordinate, promote and oversee the programmes.

SIG (Social Science Information)

11 Recommendation

The meeting of the SIG (Social Science Information) after a thorough discussion on the problems and the complexities in handling, managing and retrieving social science information especially in the context of exponential growth of social science literature in the country and abroad felt the emerging need for specialised knowledge to combat the situation &

RECOMMENDED that specialised training course of short duration in documentation in social sciences be organised in specialised body like NASSDOC and or Universities at par with Associateship in Documentation course of INSDOC.

Resolution on general issues

12 Recommendation

The seminar learns with surprise the closure of manuscript library of the Sanskrit University,Varanasi and

RECOMMENDED that the authorities of the Sanskrit University as well as the UP Government be urged upon to reopen the Manuscript Library of the Sanskrit University in no time and also to set up a Committee to review the work in the Library to suggest the appropriate norms & techniques for its improved functioning.

13 Recommendation

The general body of the IASLIC viewed with dismay and anguish the continuing inroads of the non-professionals to head the Library and Information units even after long tradition of Library and Information Science education imparted at different levels in the Universities and specialised bodies like INSDOC and DRTC, it is accordingly

RECOMMENDED that the Central and State Government, Universities, Scientific,Technological and Research bodies be moved to stop inroads of non professionals to head the Library and Information units immediately as well as to appoint the professionals replacing the non-professionals wherever occured.

Non-official resolution

Proposed by: Dr. (Mrs) Jayati Ghosh
Librarian (Grade-I),Commercial Library & Reading Room,Calcutta.

14 This seminar noted that there were different types of anomalies in designations, pay scales etc. among the Librarians/Information Scientists as also had been fully observed by the. Fourth Pay Commission, it is therefore

RECOMMENDED that the Government of India be approached to introduce All India cadre for Library Service like the other All India services such as Indian Economic Service, Indian Statistical Service, Indian Broadcasting Service etc. to accord the appropriate status and recognition to the Librarians Information Scientisits similarly as other All India Services in the country.

IASLIC Workshop on Thesaurus in Information Retrieval

A ten days workshop on the Thesaurus in Information Retrieval was organized by IASLIC in Hyderabad from November 10-20,1986.Sixteen participants from all over India attended the workshop. The workshop was inaugurated by Prof.G.M.Reddy,Principal,University College of Science. Mr.T.N.Rajan, Scientist Incharge,INSDOC, presided over the inaugural function.

The workshop provided theoretical base as well as practical orientation of the principles and techniques of theasuri construction and use. Emphasis was laid on participants use of thesauri from the point of view of their working environments. The resource personnel supplemented their lectures by use of transparencies,slides, films etc. Ample opportunites provided to participants to discuss and interact with resource persons.

PEOPLE IN THE NEWS

Shri J.L.Sardana,Librarian,Indian Institute of Management,Lucknow has joined Delhi University as Professor of Library & Information Science in the month of February 1987.

Shri T.K.Datta,senior scientist of CSIR has been appointed as Scientist-in-Charge,INSDOC w.e.f.24.12.1986.

FORM IV

(See Rule 8)

Statement about ownership and other pacticulars of GILA BULLETIN

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I, O.S.Sachdeva, hereby declare that the particulars given above are true to the best of my knowledge and belief.

(Signed) O.S.Sachdeva
Signature of Publisher.

Dated 15 March 1987.

Information

Donation in memory of S S Saith

A sum of Rs.46000 has been donated by Mrs.Saith wife of Late Mr.S.S.Saith, to the University of Delhi to institute a scholarship of Rs.500 per month to the student securing the First Class First position in B.Lib.Sc. exam in Delhi University. The scholarship would be given for 12 months particularly for pursuing studies in M.Lib.Sc.

It may be recalled that Mr.S.S.Saith formerly Librarian in the External Affairs Ministry, passed away in London,U.K.,on 24th Jan.1986 after a long illness. He is survived by his wife and one son.

DATA CENTRE FOR PETROCHEMICALS

The Government approved the setting up of information and data bank for the petrochemical industry at the Indian Petrochemicals Limited (IPCL). It will serve the needs of entire industry based on petrochemicals. A Group consisting of Dr. S. Gaungly, Chairman, IPCL, Shri L N Doshi, Joint Secretary and other officials will draw up the details required to build up such a centre keeping in view the recommendations of the Committee on Perspective Planning for Petrochemical Industry.

They will consider the sources of information, products to be covered and type of equipment necessary to ensure completeness,timeliness and authenticity of the data. This industry represents a high technology activity with fast rate of obsolence and high capital requirements. With the tremendous interest in the field of petrochemicals shown and the criticality of policy decision on the survival of sub-units in the industry, it becomes necessary that organised information base for supporting policy decisions be taken up and made a reality.

The range of petrochemicals and their usages are wide and diverse. They are regarded as the most value added products out of a scarce natural resources.

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TECHNOLOGY

The Domesday Book on video

Barry Fox

A MODERN DAY, computerised Domesday Book, the Domesday Project, is being launched later this month.

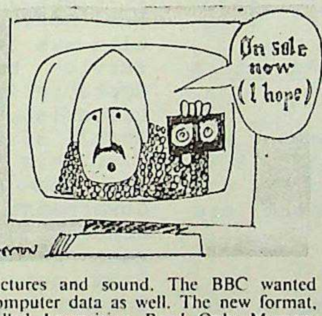
Its launch is long overdue. The Domesday Project was supposed to have been ready for Michaelmas (29 September). The plan was to commemorate the 900th anniversary of William the Conqueror's book with a celebration of information technology. The original date was missed, but to ensure that the project was working in anniversary year, a network of 40 specialist dealers around the country should have systems on display by early December. There are unlikely to be many for sale until next year. The BBC, Philips, Acorn Computers and the Department of Trade and Industry are producing the electronic Domesday Book, which is a computer-controlled video disc. The development costs are about £2·5 million.

The BBC has pre-empted the launch by publishing full details of the technology to a small circle of broadcast engineers. The big question, which will not be answered until launch day, 25 November, is how much the discs and essential replay system will cost. If, as now feared, it costs nearly £4000, schools and libraries will not be able to afford it.

The BBC originally planned to make a series of TV documentaries on Domesday, but soon found it faced the same problem as King William: although there is no shortage of information on life in Britain, there is difficulty in collating it for easy access. The BBC decided to publish on optical disc instead of paper, and teamed up with Philips to use a computer-controlled Laservision video disc.

Acorn, which already makes the BBC Micro computer, offered to provide the hardware and software. Engineers at the BBC found that the original Micro needed too much modification. So Acorn developed the new Master 128. The BBC also took over responsibility for the software from Acorn, and paid a specialist firm, Logica, to help. Without this move there would have been no hope of meeting the 1986 deadline.

Philips developed a modified disc. A conventional Laservision video disc stores pictures and sound. The BBC wanted computer data as well. The new format, called Laservision Read Only Memory (LV-ROM), looks to the user like a conventional analogue video disc. The LV-ROM, however, also carries digital information imposed on another carrier frequency, which is recorded on the disc between the video signals. The Domesday disc is thus like a combined video and compact disc. It can hold up to 45 000 images of still pictures and 300 megabytes of data, equivalent to around 30 million words of text.


On sale now (I hope)

There will be two Domesday discs, the Community Disc and the National Disc. The Community Disc contains a "people's database", with 24 000 Ordnance Survey maps and local information, which 14 000 schools round the country have supplied to the BBC on floppy disc. The BBC collated the data from schools on a VAX minicomputer over 15 months, and wrote a comprehensive index.

The National Disc contains 9000 sets of statistics, and 50 000 photographs acquired from libraries and museums. There are also 60 minutes of moving pictures and sound.

The discs play on a modified Laservision disc player. Each picture on the disc has an identifying number in digital code, and a microprocessor in the player recognises number codes sent by the computer. For example, when the computer sends code "200", the player automatically searches out picture number 200 and displays it on screen.

The video circuitry in the computer and the player are locked together, so that text or graphics generated from the computer can be superimposed on whatever picture from the disc is frozen on the television screen. The user, for example, pinpoints a place on a map with a cursor, and then homes in on a larger-scale map and whatever information and pictures the disc stores for the area.

The tricky part has been programming the Acorn computer to search the LV-ROM index. The retrieval software, developed by Logica, is also stored on the video discs. It loads automatically when Domesday is switched on. Unfortunately, the Acorn computer lacks the memory to store all the retrieval software at the same time. So the Acorn has to compromise by holding a "kernel" of software permanently in memory and then loading smaller chunks of the program as they are needed. Inevitably, this will slow down the system.

The project's backers are confident that the technology works, but they know they face a serious problem over sales. If they charge a realistic price they will put customers off. If they sell cheap they will lose money on every system sold. ☐

New Scientist 13 November 1986

GILA NEWS

SECRETARY'S REPORT

It is my pleasure to extend a hearty welcome to all of you this afternoon to the General Body Meeting of GILA.

Office Bearers and Member of Executive Committee.

The Association in its General Body Meeting held on 10th August,1984 at 5.15 P.M. in the Planning Commission Library,Yojana Bhavan,Sansad Marg,New Delhi, elected the Office Bearers and Members of the Executive Committee for the years 1984-1985 and 1986.

Membership:

The membership of the Association in all categories(viz.Institutional,Life and Ordinary) increased reasonably. The comparative statement of membership is given below:-

Year	Institutional Members	Life Members	Ordinary Members
1984	67	93	26
1985	114	105	36
1986	114	121	10

Audited Accounts of GILA for the years 1983,1984,1985 and 1986:

The statement of receipt and payment of GILA for the years 1983,1984, 1985 and 1986 have been audited by the Chartered Accountant and the same are presented for adoption.

Good Offices Committee:

The Secretary and President of the Association participated in the deliberations of the Good Offices Committee including its meetings from time to time.

All India Library Conventions:

The Vth All India Library Convention of GILA was held from May 23 - 26, 1985 at Gurukul Kangri Vishwavidyalaya, Hardwar. Two seminars were organized at the Convention. The theme of the Seminar I was ´Library and Information Services for Research, Planning and Decision Making´ and theme of the Seminar II was The Factors relating to Individual effectiveness in the Library Organization.

The Convention was inaugurated by Shri T. R. Chandrasekaran, Managing Director,BHEL,Hardwar. Shri G.B.K.Hooja, Vice - Chancellor,Gurukul Kangri,Vishwavidyalaya presented his welcome address. Shri M.K.Jain,President,GILA, delivered Presidential address. Shri D.R. Kalia, Ex-President of GILA was made the patron on this occasion.

The VIth All India Library Convention was held at Grand Hotel,Shimla from September 1-4,1986. The theme of the seminar organised at the Convention was ´The Challenges of New Technologies´. The sub-themes were;"New Roles and New Goals for Information Handlers and ´Future Competencies Needed for Library/ Information Science Professionals´.

The Convention was inaugurated by Hon.Shri Sagar Chand Nayyar,Education Minister,Government of Himachal Pradesh. Smt.Margaret Chatterjee,Director,Indian Institute of Advanced Studies,Shimla, was the the Chief Guest. Shri M.K.Jain, President,GILA,delivered his Presidential Address. Shri R.D.Gupta,Treasurer, GILA was felicitated for his meritorious service to the GOI and GILA. Mr R.D Gupta retired from Government service as Librarian, Ministry of Finance in April ´86.

This conference was well attended by the Librarians working in the Government Departments, colleges, schools under Himachal Pradesh Government in addition to G.O.I.Librarians from outside.They took active part and interest in making this convention a success. The association placed on record the good work done by S/Shri V.S. Chauhan, N.K.Gupta, S.R.Yadav,S.P.S.Rana and B.L.Bhel and other members of the Organizing and Reception Committees. On this occasion the Association of Librarians of Himachal Pradesh was formed under the Chairmanship of our President Shri M.K.Jain. On the inaugural day Honble Minister of Education of Himachal Pradesh,Shri Sagar Chand Nayyar presented, International Library Movement Award to Shri M. K. Jain, President, GILA and Prof. (Mrs) Margaret Chatterjee, for the year 1986. They were honoured with the title Surya for their work on Scientific Research, Education and Library Science.

Refresher Courses:

A course on Indexing and Abstracting' was organized from 15th August,1984 in the Yojna Bhavan,Sansad Marg, New Delhi for a period of one week. About 18 candidates from different libraries of the Government departments attended and successfully completed this course.

A training programme "Application of Computers to Library and Information Services" was organized in collaboration with DESIDOC,Metcalf House,Delhi, from 18-29, Nov'1985. It was full-time course and the participants were made to sit on terminals of computers to get practical experience. This course was inaugurated by Air Commodore,Shri R.K. Mehra, Director,Training and Sponsored Research, R&D Headquarters, M/Defence New Delhi. Shri S.S.Murthy, Director, DESIDOC also addressed the audience. The certificates were awarded to about 18 participants from different libraries of Delhi and outside by Hon'ble Shri R.V.S.Peri Sastri,Chief Election Commissioner of India.On this occasion Shri O.S.Sachdeva was felicitated for his meritorious services to the GOI and GILA. Shri Sachdeva retired as Librarian, Ministry of Home Affairs,in Feb '86 after 37 years of dedicated service.

IFLA Conference

Shri M.K.Jain, President, GILA attended 50th IFLA General Conference at Nairobi,Kenya from 19th to 24th August, 1984, and submitted his paper, "The Basics of Library and Information Services for National Development in India". Shri Jain was elected as one of the members of the Administrative Libraries Sectional Committee.

President GILA could not attend 51st IFLA Conference at Washington,USA, yet his paper titled "Administrative Libraries and Universal Availability of Information (UAP) with special reference to India", was accepted and published by IFLA.

Shri O.S.Sachdeva, Secretary and Shri M.K. Jain, the President, GILA submitted a paper for 52nd IFLA Conference at Tokyo, Japan, which was accepted and published by IFLA. The title of the paper was "Administrative Libraries in India-A Scenario by the end of 20th Century."

Executive Committee

The Executive Committee met 14 times during this period and in December, 1984 Shri Sube Singh,Documentation Officer was co-opted as member of the Executive Committee of GILA. It was decided by the Executive Committee to associate Shri R.L.Sharma as Asstt. Secretary for carrying out day-to-day work of the Association, due to heavy secretariat work.

Condolences:

Condolence resolutions were passed on the sad demise of the following members and dignitories:-

i)Smt.Indira Gandhi,
Ex-Prime Minister of India.
ii)Mrs.Shashi Dadonia,
Librarian,Telecommunication
Reseach Centre.
iii)Shri H.R.Puri,
Librarian,Air Headquarters.

The copies of the resolutions were sent to the family members of the bereaved.

Study Tour to the Libraries/Information Centres of South-East Asian Countries:

The Association organized a study-tour to the Libraries/Information Centres of South East Asian Countries i.e. Thailand, Malaysia and Singapore from 15th to 25th January,1986. A group of about 14 librarians from all over India participated in the tour. Some of them with their families. The President GILA,Shri M.K.Jain was the group leader.

The group visited Pattaya,Bangkok, Genting Highlands, Kualalumpur and Singapore. During the stay in Bangkok the group visited National Library, Bangkok where rare books and manuscripts of 17th century AD are available.

In Malaysia Librarians visited University of Malaysia Library,Rubber Research Institute of Malaysia and National Library of Malaysia at Kuala Lumpur. Shri J.S.Soosai, Head of the Rubber Research Institute arranged and demonstrated the dissemination of Information on Computers in his Institute which is completely computarized and arranged a lunch besides the reception held by the Malaysian Library Association.

While in Singapore the members of the group visited National Library of Singapore, Singapore Broadcasting Corporation, and National University Library Singapore. At all these places the group members were entertained. The National University Library of Singapore had their operations fully automated. Computers were being used by staff and students with great ease.

GILA - D.R.Kalia Award

The nominations for the award were invited through announcement in our issues of GILA Bulletin and also through a circular to all the members. Unfortunately the response was not encouraging inspite of the repeated notices. Therefore, this biennial award was delayed. However, action has been initiated on the few nominations received so far.

Foreign Guests:

Shri J.S. Soosai, Chairman, IFLA Regional Section for Asia was in India during the month of April,1986. The Association treated him as a special guest and he also delivered a lecture on 28th April, 1986 on the activities of IFLA to the members of the Association at 35, Ferozshah Road, New Delhi. Director, NSSDC, ICCSR, Shri S.P.Agrawal was kind enough to arrange the meeting and refreshments for all the participants.

Fourth Central Pay Commission:

The Association was invited by the Fourth Pay Commission to terder oral evidence on 18th March,1985. The Executive Committee in its meeting held on 27th February,1985 decided that the following persons should present the case of librarians before the Pay Commission:

i)Shri M.K.Jain,GILA;
ii)Shri D.R.Kalia,INDAL;
iii)Shri S.C.Biswas,IASLIC;
iv)Shri T.S.Rajagopalan,ILA; and
v)Shri C.Dabral,MLAI

The recommendations of the Fourth Central Pay Commission in regard to the library staff in the Government Departments was discussed thoroughly at the time of VIth All India Library Convention held at Shimla, from 1-4 September,1986. Several suggestions offered there by the members were taken note of. In pursuance of the decision taken at Shimla a get-to-gether of the members of the Association and the representatives of other library Associations was arranged under the Chairmanship of Shri M.K.Jain,President, GILA on 6th October,1986 at 5.00 P.M. in the National Medical Library in which representative of GILA, ILA, IASLIC, Medical Library Association of India (MLAI),Defence Organizations Librarians Association (DOLA), Indian Assocation of Academic Libraries(INDAL) and Northern India Library Associations (NILA), participated.

The members expressed their resentment that Fourth Central Pay Commission failed to make pragmatic recommendations by not laying down specific pay scales for various categories of Library staff. Though the Pay Commission recognized the standing problem of librarians like stagnation, many entry points and disparity in pay scales of librarians of the University and Colleges and the Government departments, yet they did not make specific recommendations. The Pay Commission recommended that the Government should set up a Committee to study and solve these standing problems including pay scales. A joint select committee of various Library Associations and their functionaries was set up in order to pursue the matter with the Government. The following persons were nominated:-

i)Shri C.Dabral,MLAI - Chairman;
ii)Shri V.K.Jain,GILA - Member Secretary;
iii)Shri Nasib Chand,NILA - Member;
iv)Shri C.P.Vashist,ILA - Member;
v)Shri C.V.Subbarao,IASLIC - Member
vi)Shri Balbir Singh,DPL - Member;
vii)Shri S.N.Mehta,DESIDOC - Member;

The President,Secretary of GILA and Shri R.P.Grover,Librarian,R.R.Division, Ministry of I&B,met Shri R.C.Trijpathi, Jt.Secretary,Deptt.of Culture in the month of December,86 to impress upon him to expedite the constitution of the Committee proposed by the Fourth Pay Commission. Shri Tripathi asked the Association to send one name to be represented on that Committee. This matter was discussed in the Executive Committee meeting held on 22nd December, 1986 and it was decided that the name of Shri V.K.Jain, Chief Librarian,Ministry of External Affairs may be communicated to Shri Tripathi for associating him with the Committee as representative of GILA.

Grant-in-Aid:

We are grateful to the following organizations who have been helping us financially in organizing various functions, training courses and other activities of the Associations:-

i) Indian Council of Social Science Research(National Social Science Documentation Centre)New Delhi;
ii) National Information System for Science and Technology (Deptt. of Scientific and Industrial Research, Ministry of Science and Technology), New Delhi;
iii) Defence Scientific Information and Documentation Centre(R&D Organization)Ministry of Defence, Delhi;
iv) Oil and Natural Gas Commission, Dehradun; and,
v) Indian Petrochemicals Corporation Ltd., Vadodra.

Acknowledgements:

I am grateful to our President for his guidance, cooperation and to other office bearers and members of the Executive Committee for their advice and cooperation without which it could not have been possible for me to function.

In the end I thank all the members of the Association who cooperated with me in the working of the Association during the period under report. I am also thankful to S/Shri Ram Lok Sharma, J.L.Kishnani and Raj Kumar who were responsible to run GILA Secretariat efficiently and effectively.

O.S.SACHDEVA

MINUTES OF THE GENERAL BODY MEETING HELD ON 6.5.1987

The Annual General body meeting of the GILA was held on 6.5.1987 in the auditorium of the ICSSR at 6.00 p.m.

54 members were present and Shri M.K.Jain, President of the Association was in the chair. The following business was transacted.

i) The minutes of the last General Body Meeting were read and confirmed.
ii) The Secretary presented the annual report of the activities of the GILA for the years 1984, 1985 & 1986. The report was discussed and adopted with some modifications.
iii) The statement of accounts for the year 1983 to 1986, audited by the CA, were placed before the house. The accounts were duly passed after seeking some clarifications.
iv) A few resolutions received from the Members were placed before the General Body Meeting. Since some of the resolutions pertained to the Constitutional amendments, it was decided, that the resolutions may be placed before the Extraordinary General Body Meeting to be called for the purpose in future.
v) Some members complained about the Non-receipt of circular notice of the meeting. The Secretary pointed out that the circulars were duly posted to all the members which most of them had received. The non-receipt of the Meeting Notice can only be attributed to postal difficulties. It was, therefore, decided that in future all the circulars be sent Under Postal Certificates.
vi) The House nominated Shri Raj Kumar as Returning Officer to conduct the proceedings of the Election. The proceedings of the election went on smoothly in the case of President and two Vice - Presidents, which were elected unanimously. Thereafter election of secretary was taken up, two names came forward and no unanimity could be reached. The moment Returning Officer called for voting by raising of hands the members objected to procedure of the voting and some confusion was caused due to these objections.

It was, therefore, decided that the election for the whole Executive Committee may be taken up again as early as possible through ballot papers. It was agreed that till such time the new Executive Committee is elected, the present Executive Committee will continue.

Thereafter the meeting adjourned.

NOTICE FOR ELECTIONS 1987

GOVERNMENT OF INDIA LIBRARIANS
ASSOCIATION(Regd.)
C/o Planning Commission Library,
Yojana Bhavan,Sansad Marg,
New Delhi-110001(India)

Ref:GILA/ELEC/1987 Dated:8th June,1987

Dear Friend,

In pursuance of the decision taken in the General Body Meeting of GILA held on 6th May 1987 at 35,Ferozeshah Road, New Delhi, the election of the office bearers of the Executive Committee, will be held by Ballot. The following set of procedure has been evolved and approved by the Executive Committee in its meetings held on 22nd May and 3rd June, 1987 respectively, after taking into consideration the rules laid down in the Constitution of GILA and the bye laws of IASLIC for holding elections:-

1. Professor B.Guha,who has kindly consented,has been appointed as Returning Officer.
2. Eligibility of Voting:

i) Ordinary Members: The persons who enrolled themselves as Ordinary Members of the Association on or before 30th June 1986 and have had no outstanding dues on 5th May,1987, will be eligible for voting and contesting the election of the office bearers of the Executive Committee.

ii) Institutional Members: All the Institutional Members who have paid their subscriptions for the year 1985 and 1986, are eligible for voting and contesting the election of the office bearers of the Executive Committee subject to the condition that only the person nominated by the Library Incharge, in writing, will be eligible for participation in the election. If no intimation is received, there will be no participation.

iii) Life Members: Those, who enrolled themselves as Life Members on or before 30th June 1986 are eligible for voting and contesting the election of the office bearers of the Executive Committee.

iv) Nominations: Nominations for the following posts of the Executive Committee are invited by 29th June 1987 upto 5.00 p.m.

1. President	One
2. Vice-President	Two
3. Secretary	One
4. Assistant Secretary	Two
5. Treasurer	One
6. Members	Six

All the nominations should be duly signed by the proposer. These should also be seconded, and have the consent of the person nominated. All the three - persons should be valid members and eligible for voting. All nominations should be sent in the prescribed proforma (specimen enclosed).

Ballot Papers: The Returning Officer will issue the Ballot Papers to the eligible voters at least 30 days before the date of election, after scrutinizing the nominations received on or before 29th June 1987, upto 5.00 p.m. The Ballot Papers will be sent by post Under Postal Certificate(UPC). The last date of withdrawal of the nominations is 7th July 1987 upto 5.00 p.m. On 10th July 1987 Ballot papers will be issued. The last date for receipt of the Ballot papers, duly filled in, is 10th August, 1987 upto 5.00 p.m. The Ballot papers are required to be sent on the following address in sealed covers:

Professor B.Guha,
I-1609,Chitranjan Park,
New Delhi-110019.

The Ballot papers will be kept in the safe custody of the Returning Officer, who will conduct the counting of votes one hour before the commencement of the General Body Meeting, to be held for taking over of the New Executive Committee. The date of the General Body Meeting will be communicated later on.

The candidates contesting for various posts may nominate their agents (one for each post) and send the names to the Returning Officer before the date of counting the votes. Only one agent for one post will be allowed by the Returning Officer at the time of counting the Ballots. The final result will be announced by the Returning Officer at the General Body Meeting. The decision of the Returning Officer in all matters of Election will be final & binding.

Please note that the Secretariat of GILA will not be responsible for the non-receipt of Circulars and Ballot papers which will of course be sent Under Postal Certificate (UPC).

The list of valid voters will be available for consultation only, between 3.00 to 5.00 p.m. from 15th June 1987 t0 10th August, 1987 (except Sundays and Holidays) (1) at the residence of Returning Officer,(2)at GILA´s Office, and (3) with Special Officer,NASSDOC, ICSSR,35,Ferozeshah Road,N.Delhi-110001.

Sincerely,

(O.S.SACHDEVA

All Members

Govt.of India Librarians Associations (Regd)

(Nomination Form)

I propose the name of Shri/ Shrimati/Miss____________of_____________ for the post of____________________________.

Date:

Signature__________________
Name(in capital)___________
Membership No._____________
Address:___________________

I second the proposal

Signature__________________
Name(in Capital)___________
Membership No._____________
Address:___________________

Date:

I accept the nomination

Signature__________________
Name(in Capital)___________
Membership No._____________
Address:___________________

Schedule of Elections at a Glance

1.Last date of receiving Nomination Papers	29th June, 1987 upto 5.00 p.m.
2.Scruting of Nomination Papers	30th June, 1987 at 10.00 A.M.
3.Last date of withdrawls	7th July, 1987 upto 5.00 P.M.
4.Announcement of the list of Candidates	8th July, 1987 at 5.00 P.M.
5.Mailing of Ballot Papers to Members (Valid voters)	by 10 July,1987
6.Last date of receiving the Ballot Papers	10 August, 1987 upto 5.00 P.M.
7.Opening of Ballot Papers & counting of votes and Announcement of Results.	Date to be communicated after the date and time of the General Body Meeting are fixed.

TRAINING PROGRAMME ON VISUAL PRESENTATION THROUGH SLIDES

For effective presentation of ideas and project proposals, the visual media, especially the 35mm slides, plays an important role. DESIDOC organised the training programme on the planning and presentation of technical ideas through slides on 20-24 April 1987 at its premises in Delhi, in which twelve scientists from various Defence R&D Labs/Estts in the country participated. The main emphasis on the subject was about planning and production aspects.

The topics covered in the training programme were, concept of visuals, colour schemes & composition, artwork - materials & methods, selection of information and visuals from the text, process & method of slide production by photographic method and by computer, projection equipment & system. The curriculum included both theory and practicals. A demonstration of the IBM software for slides called STORYBOARD was given on the SIVA PC/AT.

The chief member of the faculty was Shri K.Ponnuswamy, an expert from the SCL Institute of Photography, Madras, other members being S/Shri N.K.Dattu Sadamate & N.B.Bhatnagar from the Armed Forces Film & Photo Division and S/Shri P.V.Rao & R.K.Srivastava from DESIDOC.

Shri S.S.Murthy Director,DESIDOC delivered the inaugural and the valedictory address. S/Shri V.K.Rangra & P.V.Rao were the course coordinators.

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Volume 7 June & September 1989 Number 2&3

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गु० कां० विश्वविद्यालय
हरिद्वार

10/8/90

Official Organ of the
Association of Government Librarians &
Information Specialists

aglis JOURNAL

(Formerly GILA Bulletin)

AGLIS JOURNAL (formerly GILA Bulletin), a quarterly publication, started in the last quarter of 1982. It publishes articles, notes, etc. covering current information activities and technologies in the library and information field. It also includes information about government policy decisions affecting the library profession in the country.

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SEMINAR ON MODES OF ACCESS TO ONLINE DATABASES AND APPLICATIONS OF CD-ROM AND OTHER OPTICAL DISCS, BANGALORE, JUNE 27-29, 1988

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ONLINE INFORMATION RETRIEVAL : AN EXPERT SYSTEM PARADIGM

M.A. GOPINATH

Documentation Research and Training Centre
Indian Statistical Institute, Bangalore-560 059

1. INTRODUCTION

Online information retrieval is a typical machine interaction in live form. Modern communication technology has brought in a variety of communication devices to improve its efficiency and effectiveness. Besides computer as a communication device, bridging the distances, tele-access is also available through satellite and microwave links. However, to improve qualitative output of information retrieval, several intelligent information inputs in the form of knowledge base and inference engine have been developed. It is an obvious fact, that a human intermediary not be replaced totally. But attempts can be made for on various near-intellectual operations using a variety of knowledge representation and updating modules to improve user friendliness of information system. The latest trends in design and development of expert systems to help intelligent information retrieval is presented in this paper.

2. PREMISES

An information retrieval system is a system which stores information and provides access to the same in time of need. It has an indexing and searching process built into it for storage and retrieval. It calls for

- Articulation of an information need;
- Processing the ambiguous and hazy statement to a precisely formulated expression;
- Structuring the relationship of component ideas;
- Matching the same with organized surrogates of information sources or the informatioin itself; and
- Continuously updating the interactions of an information use and information products.

Knowledge of the conceptual aspects of information storage and retrieval would help following aspects:

- Provide better access;
- Narrow down or broaden the search results;
- Alternative search patterns;
- Distinguishing between no matches due to a search error; and
- No matches between the items not in the database.

The studies presented in this paper aim to analyze the concept--modelling aspects of information retrieval.

3. BASIC FEATURES OF AN INFORMATION RETRIEVAL SYSTEM

The basic necessity for information retrieval is the identification of labelling of the items of information. Many of the discussions of information retrieval go on the accessibility of this item at the time of the need. The ease of access or quickness of response towards an information need is used as a measure of efficiency and effectiveness in information retrieval.

The search for information, when clearly known and precisely expressed can be located faster in an organized system. It is called specific item search. It is recalling precisely items known to exist in the information sytem. This appears to be a simple problem. But when there is uncertainty in the expression of information need, there is a need for an interactive approach to the system, browsing and selecting of information and retrieval of it. This calls for semantic expressiveness in naming the item of information.

Indicative expressiveness of the semantic contents becomes a problem. In such cases, naming calls for identification as well as an indication of the content and features of the system. An ideal name would be the one which precisely identifies as well as expresses the semantic and other features of the information content or the source of information. The role of an information modelling language is to assist information processing features of information retrieval.

4. INFORMATION PROCESSING LANGUAGE

The information retrieval can be made efficient by adopting an information processing language. Such a language should have the folliwng features:

- The items of information have to be indexed in a variety of ways.

- These descriptions should be done in such a way that they provide thresholds for searching to catch the labels that help to satisfy the information needs.

- The structure of the labelling of items of information should be easily represented in computerized databases.

The structural basis of the language for representation of ideas is based on linguistic features. That is, there are objects or entities that have some special attributes or properties and have the capability to activate or to be influenced by actions. Further, such activities are in a dynamic state effecting changes in the objects, properties and actions over space and time. The development of languages for representation of knowledge may be summarized in the following statements.

- The knowledge representation calls for concentration on the application of the specific universe of discourse of semantic domain; this is taken care of by the user's conceptualization of the world;

- The modelling parameter in the representation language is the objects of this world. Any object's features cannot always be represented by the name. The name is only a key external identifier;

- There are relationships between the objects that are discernible. These relationships can be expressed as properties of interacting objects;

- There are also actions or activities generated from these objects and properties;

- The objects, properties and actions can individually and collectively change over space and time. The identification of any particular state of these three concepts are space and time bound.

- We can build a hierarchical classification for objects, properties and actions. Hierarchy is generally accepted as effective method for reducing the complexity of a design, by making it more intelligible to designers and easier to process by design tools. However, hierarchy complicates the design description by introducing considerable additional structures, that is, configurations. The design database must include information that describes how composite objects are built up from component objects.

- Thus, a design of database consists of a collection of interrelated objects. These objects can have several instances. The objects can either be composite or formative. Formative objects cannot be further decomposed into components, while composite objects are composed of more primitive composite and primate objects. For example, "steering wheel" is a composite of "steering system" which is a composite of "motion dynamics part", which in turn is part of an "automobile". This way, we create a configuration of hierarchies for objects.

- Properties associated with objects can have multiple values. National language can be used to express these;

- Syntactic modelling is capable of providing frames for variation in relationship, etc.

5. FACET ANALYTIC APPROACH

In concept modelling, we could also adopt the facet analytic approach of Shiyali Ramamrita Ranganathan (1967). He proposed a universe of discourse, called "basic class". With a basic class, several entities, their properties and actions can be studied in relation to space and time. Based on these analysis he identified a scheme for classification. He postulated categories that gave generalized abstractions. In each instance, a subject may have the presence of one or more of these categories. The categories are stated as follows:

Time	:	The pervasive temporal aspects of the world such as day, night, year, century, etc.
Space	:	Geo-spatial and other spatial concepts in the relational system, such as India, USA, USSR, etc.
Energy	:	Actions of various varieties such as running, managing, communicating, modelling, etc.
Matter	:	The properties and other attributes of our object, such as name, valency, mobility, viscosity, etc.
Personality	:	The objects, their instantial variations, such as automobiles, passenger cars, sports' car.
Basic class	:	Chunk of a field of knowledge convenient as field of activity such as "Vehicle Engineering", "Land Vehicle Engineering". "Motor Vehicle Engineering".

6. APPLICATION TO DESIGN DATABASE FOR MOTOR VEHICLE ENGINEERING

We shall study the application to the field of "Automobile Engineering". This is our basic class. We are asked to express the concept "Plastics Body for Racing Car" for representation in the database. This can be analyzed into:

Motor car, racing purpose, plastics body

More detailed description of the object to represent the content for presenting features of better choice can be obtained from the following:

Motor car

Brand	:	Borg Warner Cycolac
Purpose	:	Racing
Weight	:	Dry weight 11-4 wt
Dimension	:	Overall length 13' Overall width 5'14" Ground clearance 5'5" Overall height 2'5"
Engine	:	Petrol engine Maximum power: 170 bhp at 6,800 rpm Number of cylinders:6 Cooling system: air cooling

Another example is the analysis of the following:

Ford's versatile Broneo, 4-wheel drive, utility with 3 models:

Analysis

Entity	:	Motor truck
Brand	:	Ford Broneo
Purpose	:	Multipurpose
Weight	:	Dry weight 38 cwt Weight distribution on front axle 67% Weight distribution on rear axle 53%
Dimension	:	Overall length 12' 8" Ground clearance 6' 6"
Engine	:	Petrol engine Maximum power: 0.15 hp at 6,300 rpm Maximum engine: 146 ft per sec at 3700 Number of cylinders:6 Displacement:170 cu. in.

Cargo body : Length 6' 11"
Width 5' 1"
Capacity 33 cu. ft.
Suspension : Rear: leaf spring
Front: coiled spring
Wheel : Front and rear track
6' 9"

Transmission

Gear box : 6-wheel drive
3-forward drive
2-transfer case
Gear ratio : Third 1 to 1
Second 19 to 1
First 34 to 1
Manual shift, synchronized counter shift
Steering : Diameter of turning
circles between
curbs 36'

Thus, we see that the expressions summarizing information contents of objects can be analyzed into basic class, personality and other properties. Such an analysis leads to an intermediate lexicon of ideas which can be used as modelling media for input information in any specialized field as well as a media for searching information from the database. Lists of groupings for various features of automobile useful for analytic representation can be easily built into a design database. We shall discuss this process in KBMS systems also.

7. KNOWLEDGE REPRESENTATION SYSTEMS

- Knowledge bases have to be organized and structured as the rule embodied in them goes on increasing. Thus knowledge representation language comes into play. Many issues in this context handle both conceptual factoring and computational efficiency. In techniques such as semantic nets, conceptual taxonomies, frame systems, etc. knowledge is conceptually factored according to a hierarchy or generalization structure. It is a kind of taxonomic or classificatory structure. KL-ONE, is a knowledge representation system oriented around a taxonomy of structured concepts. The taxonomy for organizing a knowledge base of rules is as follows:

- A concept mode in KL-ONE is associated with a set of rules (a generalization) of the notions of attribute, part, constituent feature, etc. and a set of structured conditions expressing relationships among them. Concepts are linked to more general concepts by explicit links. The more general concept in such a relationship is called the super concept and is said to subsume the more specific subconcept. some of the concepts' roles and structural conditions are attached to it directly, while others ar inherited indirectly from more general concepts.

- The concepts and roles of KL-ONE are similar in structure to classical data structure notions of record and field or the "frame"/"schema"/"unit" and "slot" of much AI terminology. However, they differ subtly in function and interpretation since they are motivated more by an attempt to model the semantics and conceptual structure of an abstract space of concepts than by issues of data and referral operations. This difference manifests itself in a variety of details, such as the way subsumption is defined and used, the pressure of associated structural conditions attached to a concept, and the representation of explicit relationships between roles at different levels of generality.

- The ability to assimilate new descriptions into an existing taxonomy at any level permits an evolutionary system design that achieves the same standards of rigour as a "top-down design" without requiring concepts to be defined in a pre-determined order. For most applications, even if one could get the initial design carefully laid out in top-down mode, subsequent changes will require an ability to modify a system in more flexible ways.

- A system's taxonomy of recognizable situations should be viewed as an evolving knowledge strucutre that continues to be defined and developed throughout the lifetime of a system, just as it is for human beings. In particular, conceptually factored, taxonomic representation systems such as KL-ONE appear to be well suited to such applications. These knowledge structures can be used to perform a kind of parsing of the situation, using the patterns and schemata of the knowledge base as to its "grammar". The way in which elements of knowledge base are accessed in this proces differs substantially from the way in which elements of a traditional database are accessed.

Such access will require techniques that are analogous to and generalizations of traditional parsing algorithms to achieve reasonable response times. A substantial challenge lies ahead of us to combine the insights of natural language understanding and knowledge representation research with those of database organization and retrieval in order to develop the techniques necessary to handle large knowledge bases of rule-like formation.

8. DEVELOPMENT OF DECISION SUPPORT SYSTEM FOR INFORMATION RETRIEVAL

Knowledge representation languages can provide a base for an intermediate lexicon. The creation of an intermediate lexicon as a base for inputs and outputs in information referral helps in the development of intermediary systems. The intermediary system will have the following features:

- It would accept statements made in a natural language as expression of the query by the information seeker.
- It would structure this statement into descriptions or key words/phrases for matching the same with system's thesaurus.
- It arranges descriptions in a sequence wherein the search for information is conducted efficiently and productive retrieval results are provided.
- It would interactively negotiate with the information retrieval system in modulating the response to a query.
- It would ask the user for terminology modulation in understanding the user's request and system's term (synonym, homonym, and other hierarchical structuring). These actions would of course be well structured by:
  - (a) Establishing the field of knowledge to be searched in the database (boundaries) and the comprehension of an information retrieval thesaurus.
  - (b) Understanding of user's levels of expertise in the subject area concerned.
  - (c) Protocols in the system to negotiate with the user on and off the search time and process.

9. CONCLUSION

The development of conceptual structure, classification structure, and the knowledge structure representation techniques indicates the varieties of ways in which concept modelling can proceed towards developing the basic taxonomy for information processing and modelling for use in information retrieval systems. With the hardware development for denser storage, retrieval and search processes are made to be efficient and effective. The software in the form of concept codes/models for information referral is one of the primary ways we can develop for utilizing the large knowledge base systems for intelligent front-end usage.

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VIKRAMNET: GROWTH OF DATA COMMUNICATIONS IN INDIA

V. PARTHASARATHY

Area Manager (Central), Telephones, Bangalore

1. INTRODUCTION

Contrary to other developing countries, the demand for data communication facilities in India has been a relatively recent development, about two decades old. For the past ten years there has been a steady growth in the demand for data services. Early applications involved interlinking a few remote terminals to a central computer. As a result of growth in computer applications and the use of more sophisticated computer systems, the demand increased both for point-to-point circuits and switched data circuits.

The applications using modern computer systems for integrated management/process control with data communication interlinking is growing. The ever increasing use of this technology by government, industry and business assures excellent future prospects for different types of data communication networks in India. It has been estimated that the Indian computer industry would continue to grow for some more years at the rate of 50 per cent. The same trend could be expected for computer communication facilities.

2. STRATEGY ADOPTED

To keep pace with the growing needs of users, action was taken in the 70's on four fronts for making available data communication facilities to users.

- Private data communication facilities were permitted to be established by users;
- Policy and commercial aspects were studied by a specially constituted group;
- Work was done to set up experimental networks, both circuit-switched and packet-switched type, as R&D projects on a limited scale; and
- Feasibility of setting up a country-wide network was studied.

3. LEASED SERVICES AND FACILITIES

The policy regarding the overall approach to leased service and facilities permitted, interalia, setting up of private networks and the use of privately owned data equipments like modem, multiplexer or concentrator. This action paved the way for increased use of data communication facilities by users for their individual applications. Airline companies and research/academic institutions constituted a major segment of the early users as they had the requisite computers and applications software. The initial demands were for leased point-to-point circuits for data transmission utilising telephone type circuits. Demands for wide band circuits were later received for specialised applications. Some of these were extended from one station to another on microwave/coaxial cable systems or via the national satellite.

4. SWITCHED DATA FACILITIES

For providing switched data communication facilities in the form of public network:

- The performance of the public-switched telephone network (PSTN) for data speeds upto 1200 bps was evaluated and, on being found suitable, this was opened for public use;

- The performance of electronic telex switches for low speed data switching (300 bps) was examined in an R&D project and is now being tried for "live" traffic;
- A limited (3-node) packet-switched data network was set up as another R&D project and has recently been commissioned;
- The project for establishing a countrywide packet network is simultaneoulsy being processed; and
- Technical support is being extended to plan and implement dedicated data networks for certain identified large users to meet their specific needs.

5. PUBLIC TELEPHONE NETWORK

The switched telephone network of the country has been tested for data speeds upto 2000 bps. It is currently being utilised on inland and overseas dialled calls and its use for data rates of 2400 bps is being studied.

6. ELECTRONIC TELEX SWITCHES

An experimental study indicated the suitability of electronic telex exchanges for use in circuit switching mode of 300 bps data traffic. This is currently being worked between the two large cities --New Delhi and Bombay-- for some subscribers. Later, it is proposed to be extended to two other cities --Calcutta and Madras-- with more customers. It provides certain extra facilities like abbreviated dialling, direct call and closed user group.

7. THREE NODE EXPERIMENTAL PACKET SWITCHED DATA NETWORK

An experimental packet-switched data network has been set up with three nodes at Bombay, Delhi and Madras in June, 1986. The broad objectives for setting up of the experimental network were:

- To get experience in setting up and operation of packet-switched data network;
- To develop appropriate interfaces and get a feel of working in a packet-switched environment; and
- To study traffic patterns and charging philosophies.

The experimental data network was developed with IDM mini computer S-3250 and the necessary hardware and software was developed by Telecommunications Consultancy India Ltd. Each mode has 32 asynchronous ports and 8 synchronous ports. The three nodes are interconnected through 4.8 kbps modems (Codex) on normal channel and 2.4 kbps modems on stand by channels through alternate routes.

The packet-switched data network was designed to provide:

- Data access through PSTN at 300/1200 bps;
- 1200 bauds asynchronous access through leased line;
- 50 bauds telex access both incoming and outgoing;
- 300 bps EDX access both incoming and outgoing; and
- 2400 bps full deuolex synchronous access using X.25 protocols.

Experimental access for leased line (1200 bps) asynchronous access was given to about seven subscribers.

8. PACKET-SWITCHED PUBLIC DATA NETWORK - VIKRAM

A packet-switched public data network to cater for various types of demands for non-voice services has been planned. The proposed packet-switched public data network (PSPDN) VIKRAM will have 8 switching nodes at Bombay, Calcutta, Delhi, Madras, Ahmedabad, Bangalore, Hyderabad and Pune and 12 Remote Access Facility Centres (RAFCs) at Baroda, Bhubaneshwar, Bhopal, Chandigarh, Ernakulam, Jaipur, Lucknow, Nagpur, Patna, Ranchi, Trivandrum and Varanasi.

The major inter-nodal trunks will be at group band speed (64kbps) and on multiple media (Satellite and terrestrial. The RAFCs will be connected to the nearest switching nodes by duplicated voice band channels at 9.6kbps.

Subscribers can access the PSPDN in different ways, viz. dedicated cable pair, dial-up, telex machines, etc. The subscribers can communicate each other even though they work at different speeds and codes. Depending on the type of access the subscriber has to adopt a different procedure (Protocol) for communication in the network (CCITT recommendation X.25 and X.28).

Subscribers using X.25 protocols can support several simultaneous calls to other subscribers on a single link to the switch (equivalent to PBX type of working in telephony). This will facilitate computers, etc. to support multiple calls from different terminals spread over the network in a time sharing mode.

There are several optional facilities which subscribers can avail of. Some of the important facilities are discussed below.

8.1 Closed User Group

This facility enables a group of subscribers to form a private network within the network. They can opt to restrict calls amongst themselves with or without a facility to "dial" and communicate with others in the network.

8.2 Reverse Charging

With this facility a subscriber can be called and billed if the call is accepted.

The errorless, reliable and cheap PSPDN has a potential for several applications for individuals, corporate bodies, computer services, banking, industry, airlines and transport sector, etc. The network will also be used for telematic services like electronic mail, videotex, teletex, etc.

9. REMOTE AREA BUSINESS MESSAGE NETWORK

The network envisages setting up of a master satellite earth station in the existing earth station premises at Sikandrabad (Bulandshehar district) at a distance of about 80kms from Delhi. The host computer interface of the master station will be installed in the multiplexing centre at Kidwai Bhawan, New Delhi. The inter-connection between the earth station and the multiplexing centre being provided through an optical fibre link and on a group band modem basis on the microwave link. The network will embrace about 1000 very small earth stations (micro earth stations) located in the customer premises spread far and wide in various parts of the country. The satellite-based network will use the space segment capacity of INSAT spacecraft or a leased transponder from any other international organisation as available.

The network will be capable of offering the message communication; telex communication; and interactive data communication (at speeds upto 1200bps) services between the remote subscribers and also between remote subscribers and their urban counterparts.

Subsequently, the network will be interfaced in Phase-II with public telex network and proposed public data network VIKRAM. The services will be very useful for sectors like banking, industries, finance corporations, public sector undertakings, agricultural industries, etc. The salient features of the proposed network are:

- Capability of embracing all parts of the country including hilly areas, islands and other remote locations;

- Provision of micro earth stations at the customers' premises solving the last mile problem for provision of a reliable communication link;

- Capability of providing services in a broadcast mode;

- Provision of high grade service;

- Insensitiveness to distance; and

- Greater flexibility for network reconfiguration.

DESIGNING AN INFORMATION SERVICE: EXPERIENCE WITH CA SEARCH DATABASE

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1. INTRODUCTION

NCSI(National Centre for Science Information) undertook designing an SDI information system using CA SEARCH database tapes produced by American Chemical Society. Actual design work was started after defining the objectives and the design environment. A bottom-up approach was adopted for design. Starting at the base level, a clear understanding of the format and contents of CA SEARCH was obtained. The design objectives were then encompassed by gradually moving upwards in the design work. The specific design steps are: analysis and definition of CA SEARCH format, study of information content, decision on database access elements and search strategy, generating quantitative data for file design, file structure design, batch and online search system design and output design. These steps were then followed by implementing the production system.

Information systems are generally described in terms of their operational features, leaving behind the design aspects on the designer's table. In contrast to this, in this paper the steps undertaken in designing an information system, i.e., an important information service provided by a major information centre, aims at alerting its users regularly with abstracts/citations of recent publications in their specific areas of interest. Since 1984 NCSI has been providing SDI services in the areas of physics, biology, geology and mathematics. The target users of NCSI services are faculty members and researchers in Indian universities and colleges. Currently more than 3000 users are being served by NCSI. Recently service in the area of Chemistry was introduced. The system design work was completed in about 6 months starting from June 1987. The production system came into operation in February 1988.

2. DESIGN OBJECTIVES

The SDI system design was started keeping in view the following broad objectives:

- The turn-around-time for processing a CA SEARCH tape should be kept as low as possible, but not to exceed one week. One week was kept as the upper bound, considering the 4 CA SEARCH tapes in a month.
- The SDI system should be able to meet the major current awareness requirements of majority of chemistry researchers. For instance, subject approach is the preferred search method used by majority of users of information services.
- Maximum benefit should be taken of the information available on tape, keeping in view the requirements of users. CA SEARCH provides, for each publication, a large number of data elements, both descriptive and subject content. However, no abstracts are given.
- The profile system should be capable of representing queries involving a large number of search elements and their combinations. Further it should be possible to isolate and represent the distinct components in terms of user requirements, as separate queries. This will facilitate easy user feedback analysis and tuning of profiles.
- The file structures created for batch SDI searching should also be

available for interactive/online searching. From our experience with other databases, particularly BIOSIS, it was found that an interactive/online search facility for one or two SDI tape data provides a very convenient means to develop new profiles. In other words, the online search facility, besides being available for ad-hoc query searching, acts as an interactive profile construction aid.

These objectives were formulated based on NCSI experience in developing SDI services for physics, biology, mathamatics, and geology. We also had the advantage of the feedback from an experimental system developed for chemistry on DEC-1090 system (1-5). The major drawback of this system was the large turn-around-time (10-20 days) required for processing a tape, a very simple query system and the non-availability of an online system.

3. DESIGN ENVIRONMENT

Around June 1987 it was decided to upgrade a 16 bit minicomputer system in NCSI to a 32 bit UNIX based system. From the benchmarks it was found that the new system will be about 6 to 8 times faster. It was decided to shift the chemistry SDI service from DEC-1090 to the new system, once the upgradation was complete. Already a major service based on BIOSIS was running on the 16 bit mini. It was felt that the increased speed of the 32 bit machine will be able to take another major service like chemistry.

The following hardware/software environment was present during the design work: WIPRO-386 computer, a 32-bit system with 4 MB RAM, UNIX system V, release 3 OS with C, COBOL and FORTRAN programming languages. Attached to this would be 2x80MB hard disk, 4 VDUs, 1 streamer tape drive, 2 heavy duty printers (300 & 800 LPM). Except for the 800 LPM printer, other peripherals were already existing on the 16 bit system. The upgradation, however, was done only in December 1987. The software required for design and testing had therefore to be carried out on the 16 bit system.

4. DESIGN STEPS

Since the SDI system for chemistry derives all its information from the CA SEARCH database, a bottom-up approach was adopted in system design. Starting at the base level clear understanding of the format and contents of CA SEARCH database was obtained. The design objectives were then encompassed by gradually moving upwards in design work. The design steps are described briefly. Although the linearity in these steps reflects the chronological progress in design, several to-and-fro iterations among these steps were necessary before the design was complete.

4.1 Analysis and Definition of CA SEARCH Database Format (Step 1)

In comparison to ISO 2709, CA SEARCH is a non-standard communication format, and our first concern was to obtain a complete understanding of its format (called SDF--standard distribution format by CAS) both at macro level (i.e., the physical medium and its characteristics and the record structure/carrier format) and at micro level (i.e., content designators and the data elements and their representation formats). Understanding at the macro level is necessary for correct reading and extraction of records from SDF. Processing of these records to extract relevant data elements requires understanding SDF at micro level.

This was achieved through a procedure called EBNF (extended Backs-Naur from developed in NCSI for analysing and defining communication formats (6). EBNF is particularly useful for analysing non-standard communication formats like SDF. The basic technique of EBNF is to treat a CF (communication format) as a syntactic entity and to describe it using its syntactic/logical components according to the BNF formalism. Each of these components is treated in turn as a syntactic entity and described in terms of its syntactic/logical components. This narrowing down of a CF is continued till it is found that further subdivision is no longer meaningful or helpful for a clear understanding of the CF. Further, as this analysis proceeds, the semantics (or meaning/description) of a syntactic entity is captured in textual form and in structured English.

Using EBNF we have been able to arrive at a more compact definition of SDF which also acts as documentation for future reference, modification, etc., to obtain alternate views of SDF and develop algorithms/programs for extraction and processing of CA SEARCH records. The details are explained elsewhere(7). Two alternate views of CA SEARCH format derived from EBNF are shown in Figs.1 and 2.

4.2 Careful Study of Information Content (Step 2)

Based on the EBNF definition a data extraction program was developed. Printouts of all the data elements (name and value) were taken for each bibliographic record on one CA SEARCH tape. These printouts were studied to obtain a complete understanding of the CA SEARCH database contents in terms of the data elements comprising a logical record are spread over three seqments in CA SEARCH, viz. control segment, bibliographic segment and index data segment. Control Segment identifies and classifies the information unit (citation number, classification number, etc). Bibliographic segment contains bibliographic information (author, title, source, etc). Index data segment comprises three types of index records viz. keyphrase, chemical substance and general subject index entry. Each index entry may contain one or more records or sometimes no records at all. The data elements that comprise CA SEARCH database are listed in Table 1. The program module written for this step was later on used for data extraction and print output generation programs in the production system.

4.3 Decision on Database Access Elements (Step 3)

As subject approach is the priority mode of database accessing given by NCSI for SDI service. CA SEARCH provides several subject access elements, namely

- Author
- Publication type
- Year of publication
- Title
- CA classification numbers (main and sub group)
- Keywords (terms extracted by CAS from title and text)
- Subject terms (concepts)
- Chemical substance
- CAS registry number
- Molecular formula
- Derivatives of chemical substance
- Stereochemistry
- Modifiers and qualifiers to subject and substance

As to which of these are to be considered for database accessing (in other words, profile construction) is a very crucial decision having implications on data extraction, file building, searching, query formulation, etc, and associated parameters like storage space, software complexity, turn-around- time, etc. Besides considering this purely from an information science angle, the following criteria was used to arrive at a decision.

- The subject indices provided in printed chemical indices (weekly & volume indices);
- User preferences in consultation of printed abstracts; and
- Subject access elements provided by online search systems like DIALOG and ESA-IRS for CA SEARCH database.

Based on these factors, the following set of subject search elements were arrived at

- Keyword
- Subject term and its modifier
- Chemical substance and its qualifier
- Registry number
- CA class numbers (main divisions only)

4.4 Decision on Search Strategy (Step 4)

Our experience with other SDI services in NCSI was the major influencing factor in deciding the following search strategy for chemistry SDI:

- One or more search terms from the set of subject search elements decided in step3.
- Search term relationships represented using Boolean operators AND, OR and NOT.

- Right truncation on keywords, subject terms and chemical substance names.

- Range searching on class numbers.

- Two level search capability--first level using keywords, subject terms, chemical substance names and registry numbers. At second level, the hit records from first level are filtered through the CA class numbers in the profile. We considered this two level search strategy essential to avoid out-of-context retrievals that are possible if the search is limited only to first level. The two level searching however necessitates that the user to give his prefered CA class number in the profile. This has been achieved by introducing this in the profile form and by enclosing a CA classification list with the form.

4.5 Generating Quantitative Data for File Design (Step 5)

Using a sample CA SEARCH tape, the following quantitative data was gathered.

- Maximum and minimum length of each access element;
- Maximum and minimum number of occurrences;
- Number of unique occurrences; and
- Average length of a bibliographic record.

Information regarding computer time requirements for data extraction and sorting of extracted terms was also collected. For example, it was found that a CA SEARCH tape contains approximately 20,000 keywords, 12,400 bibliographic records and an equal number of CA main section class numbers, 52,000 chemical substances and an equal number of CAS registry numbers and about 36,000 subject terms.

4.6 File Structure Design (Step 6)

Inverted file strucutre consisting of the following was considered.

- Master File containing all records of one CA SEARCH tape with all the relevant details necessary for output generation; and

- Index files for the five subject search elements extracted from one CA SEARCH tape.

The following criteria influenced to arrive at the inverted file structure:

- Its suitability for implementing Boolean strategy with reasonably good response time;

- Its suitability for implementing online/interactive search systems; and

- Our experience with inverted file structres.

ISAM file organisation technique was selected for organising records in these files since both random and sequential access to these files was restricted. The length of search elements in the Index Files was required to be 25 considering the data generated in step 5. All files have only one key which is also the primary key. The records in Master File are ordered by CAS abstract (or citation) number, and the records in Index Files are ordered by the respective search element values. CAS abstract numbers stored as postings link the Index Files with the Master file. The file structure is shown in Table 2.

CAS Abstract number, which is unique within a volume, is 6 digits in length and is stored in the Master File and Index Files as a 3 byte binary number. This has resulted in considerable disc storage space saving.

In Index Files, the postings (i.e., CAS abstract numbers) are stored as a variable number of fixed length records. Each fixed length record can store 25 postings (75 bytes). This technique conveniently takes care of variable nature of postings. A new posting record is created only when the previous record is full.

This technique is used in the Master File also, where a logical record is spread over one or more physical records of fixed length of 500 bytes a combination of field tags (2 digits), field delimiter (#) and record delimiter (*) is used for handling variable length data. The advantages of such a processing format for storing bibliographic data has been discussed elsewhere(7). Table 1 shows the 2 digit tags the equivalent CA SEARCH tag and the data element used in study.

4.7 Work Flow Design (Step 7)

Starting from the arrival of CA SEARCH tape at NCSI to the time of making the outputs, the distinct stages of information processing was identified. Thin aproximate computer time requirements were obtained by writing test programs to operate on data extracted from one CA SEARCH tape. These time requirements gave the necessary inputs to decide as to which steps should be bundled into one program and which should be handled separately. The workflow is shown Fig.3.

4.8 Search System Design (Step 8)

Two search systems, a batch search system for SDI based on user profiles and an online search system were cosidered. At the core of the SDI system is the profile sub-system which has to handle addition, deletion, modification, viewing and printing of specified user profiles. A rigorous definition of a profile in terms of BNF was developed (Table 3). The formulation provides construction of a maximum of 5 search expressions per profile, using the term codes which uniquely identify a search element and the Boolean operators * (AND), + (OR) and - (NOT). An expression can be nested to any level using parantheses. In an unparanthecised expression, according to the precedence rules in the formulation, OR is processed first, then AND and then NOT.

Internally, the profile system converts and stores the search expressions entered by the user, in a post-fix form. This post-fix form is used later by the batch search system for processing on the index file structures.

This highly generalised formulation completely meets the search strategy requirements set out in the design objectives and considered in step 4. This formulation can in fact be modified easily to suit the requirements of any profile base search system.

Table 4 shows an actual user profile for chemistry. The internal storage format of a profile is completely transparent to the profile analyst handling the profile system and to the user handling the print out.

For the online search system, the existing working program for BIOSIS had only three access elements--keywords, concept codes and taxonomic codes-- to suit the search strategy requirements for CA SEARCH. The chemistry online search program has now the capability to specify the search element type (K,C,S,R,T), truncated (right) search on keyword, subject and substances and range searching on class numbers. Other features like Boolean logic search, saving and recalling search results, etc. have been retained as they are for BIOSIS online searching.

4.9 Output Design (Step 9)

The information for a logical record as organised in terms of various data elements is in an unstructured fashion. In design setp 2, carefulstudy of information content, a set of data was arrived at elements, for each document type, that would be helful to the SDI user. The output formats for CA SEARCH in DIALOG and ESA-IRS retrieval systems was looked into. A structured desin for the output, is shown in printout in Table 5.

5. IMPLEMENTATION OF PRODUCTION SYSTEM

For the production system, the test programs developed for design work were enhanced. The production system has the same workflow as shown in Fig.4 in The following programs are there in terms of software modules.

1. Tapetr	-	CA SEARCH tape disc transfer (in C).
2. Casextract	-	Extraction of data for Master File and Index Files (in COBOL).
3. Wisort	-	WIPRO Sort utility for sorting data files (Utility).

4. Casisam - Creation of ISAM files (in COBOL).
5. Cassearch - Batch SDI seach program (in COBOL).
6. Casprint - Output generation (in COBOL).
7. Casprofile - Chemistry profile system (in COBOL).
8. Casonline - Online search program (in COBOL).

The turn-around-time for processing a CA SEARCH tape is about 16hr (2 days of 8hr). Currently there are about 300 users which are likely to grow rapidly in the coming months.

6. CONCLUSION

The steps involved in designing an SDI system for chemistry, using CA SEARCH database tapes are discussed. Since installation of the production system, SDI outputs were mailed to several users and the process of analysing the user feedback is currently going on.

ACKNOWLEDGEMENTS

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Table 1. List of data elements used in CA SEARCH Database

Identifier	NCSI Tag	Details of the Data Element
ID 0067 01	01	CA Publication Section/(Subsection introduced with CAS Volume 77)
ID 0267 01	02	Segment Access Key (SAK)
ID 0272 01		Correction Abstract Tag (Discontinued with CA volume 91)
ID 031B 00	03	CA Section Cross-Reference(s) (Introduced during CA Volume 76)
ID 0A65 01		Corrected Abstract Reference (Introduced with CA Volume 91)
BIBLIOGRAPHIC SEGMENTS *Heading Record (SAK Value 00080001)*		
ID 0055 01		CODEN
ID 0056 01	04	Publication Classification Code
ID 0059 01-0A	05	Personal Author Name
ID 0059 0B-14	06	Corporate Author Name
ID 005A 01	07	Location of Work: Division of Organization
ID 005A 02	08	Location of Work: Name of Organization
ID 005A 03	09	Location of Work: City
ID 005A 04		Location of Work: Country, Possession, Province, or State (Discontinued with CA Volume 91)
ID 005B 01	10	Document Title
ID 005C 01	11	Original (Foreign) Book Title
ID 005D 01	12	Abbrevated Title of Publication
ID 005E 01		Publication Date (Discontinued with CA Volume 96)
ID 005F 01	13	Series/Volume Number
ID 0060 01	14	Issue/Report/Part Number
ID 0061 01	15	Pages
ID 0062 01		Country of Patent Application of Priority Code (Discontinued with CA Volume 96)
ID 0062 02		Country of Patent Application or Priority (Discontinued with CA Volume 96)

ID 0063 01		Original Language Code
ID 0063 02	16	Original Language
ID 0064 01		Availability
ID 0065 01		Price
ID 0066 01		CA publication Citation
ID 006B 01		CAS Coverage (Discontinued with CA Volume 91)
ID 006D 01		Copy Abstract Citation
ID 006D 02	17	Parent Journal Citation
ID 006D 03		Book Review Citation (Discontinued during CA Volume 86)
ID 006F 01		Date of Meeting or Volume (Discontinued with CA Volume 96)
ID 0070 01	18	Patent Number
ID 0071 01-0A	19	Patent Assignee
ID 0072 01		Patent Classification Number (Discontinued with CA Volume 96)
ID 0073 01		Date of Patent Application on priority (Discontinued with CA Volume 96)
ID 0074 01	20	Name of Publisher
ID 0074 02	21	Address of Publisher
ID 0267 01		Segment Access Key (SAK)
ID 0315 00		Patent Application (or Priority) Number (Introduced during (A Volume 76; Discontinued with CA Volume 96)
ID 04E6 00		International Standard Serial Number (ISSN) (Introduced during CA Volume 76; Discontinued with CA Volume 88)
ID 04EE 01-FF		International Patent Classification Code (Introduced with CA Volume 96)
ID 04EF 01		National Patent Classification Code (Introduced with CA Volume 96)
ID 0506 01	22	Date of Publication (Introduced with CA Volume 96)
ID 0508 01	23	Meeting or Volume Date (Introduced with CA Volume 96)
ID 0520 01		Tranalated from Language (Introduced with CA Volume 91)

ID 0521 01		Translated from Language Code (Introduced with CA Volume 91)
ID 0A1B 01	24	Patent ISO Country Code (Introduced with CA Volume 96)
ID 0A61 01		Location of Work: ISO Country Code (Introduced with CA Volume 96)
ID 0A62 01	25	Location of Work: Country (Introduced with CA Volume 91)
ID 0A63 01	26	Location of Work: Country subunit Code (Introduced with CA Volume 91)
ID 0A64 01	27	Location of Work: Postal Code (Introduced with CA Volume 91)
ID 0AA9 01		Patent Designated Countries (Introduced with CA Volume 96)
ID 0AAA 01		Patent Designated Regional Countries (Introduced with CA Volume 96)
ID 0AAE 01		Patent Elected Countries (Introduced with CA Volume 96)
ID 0B29 01		Patent Elected Regional Countries (Introduced with CA Volume 96)
ID 0EC0 01	28	Patent Date of Application (Introduced with CA Volume 96)
ID 0ECL 01-FF		Patent Priority Application (Introduced with CA Volume 96)
ID 0EC2 01	29	Patent Application Number (Introduced with CA Volume 96)
ID 0EC3 01		Patent Kind of Document Code (Introduced with CA Volume 96)

INDEX DATA SEGMENT

Keyword Phrase Record(s) (SAK Value 003EXXXX)

ID 0066 01		CA Publication Citation (CAN)
ID 0077 01	30	Keyword Phrase
ID 0267 01		Segment Access Key (SAK)

Chemical Substance Index Entry Record(s) (SAK Value 0110XXXX)

ID 0011 01	31	Registry Number
ID 0066 01		CA Publication Citation (CAN)
ID 015F 01		Functional Category
ID 0160 01		Homograph Definition

ID 0161	01	32	Heading Patent
ID 0165	01	33	Substituent
ID 0169	01		Line Formula
ID 016D	01		Name Codes (Introduced with CA Volume 86 only NT1, NT2, and/or VAN used)
ID 016E	01		Name Modification
ID 0171	01	37	Qualifier
ID 017C	01		Stereochemistry
ID 017D	01		Text Modification
ID 0192	01	34	Preferred Order Molform
ID 0267	01		Segment Access Key (SAK)
ID 0295	01		Primary Publication Type
ID 0320	01		Auxiliary Name Modification (Introduced with CA Volume 86)

General Subject Index Entry Record(s) (SAK Value 0120XXXX)

ID 0066	01		CA Publication Citation (CAN)
ID 0151	01	35	Concept Heading
ID 015F	01		Functional Category
ID 0160	01		Homograph Definition
ID 0171	01	37	Qualifier
ID 017D	01		Text Modification
ID 0267	01		Segment Access Key (SAK)
ID 0295	01		Primary Publication Type
ID 0862	01	36	Concept Modification (Introduced with CA Volume 86)

Table 2. File structure

1. Keyword Index File

Field	Keyword	ptr.	Abs.No.(occurs 25 times)
Length	20	1	3
Type	AN	N	N

keyword ptr tpst p1 p2.............pn

2. Substance Name File

Field	Sub.Name	ptr.	Abs.No.(occurs 25 times)
Length	25	1	3
Type	AN	N	N

subs name ptr tpst p1 p2.............pn

3. Subject Term File

Field	Subj Term	ptr.	Abs.No.(occurs 25 times)
Length	25	1	3
Type	AN	N	N

subject term ptr tpst p1 p2.............pn

4. Reg.No. File

Field	Reg.No.	ptr.	Abs.No.(occurs 25 times)
Length	9	1	3
Type	N	N	N

reg number ptr tpst p1 p2.............pn

5. Master File

Field	Abs.No.	ptr.	Data Buf.
Length	3	1	500
Type	N	N	AN

abs no ptr tag1 data1 .... Tagn datan *

6. Class No. File

Field	Class No.	ptr	Abs.No.(occurs 25 times)
Length	3	1	3
Type	AN	N	N

class number ptr tpst p1 p2.............pn

7. Profile File

Field	Pro.No.	Address	Search Term	Search Expn
	(Occurs 52 times)	(occurs 5 times)		
Length	5	140	25	25
Type	AN	AN	AN	AN

pro no	Address	Sh T1	ShT2	Sh En1 ...Sh En2	Sh Enn

8. Hit File

Field	Pro.No.	Tot-Hit	Abs.No.(Occurs 10 times)
Length	5	4	5
Type	AN	N	N

pro no	tot hits	hit abs no1	hit abs no2	.......hit abs non

Legend:

Ptr : Pointer (fixed length record no)
Tpst : Total postings
pl to pn: Postings (3 bytes per posting: total 75 bytes)

Table 3. BNF description of a user profile

```
<user profile>          :: =  <user ID> <search profile>
<user ID>               :: =  <pno> <name> <address>
<pno>                   :: =  <database code> <sl.no>
<database code>         :: =  C where C is chemistry
<sl.no>                 :: =  <digit> <digit> <digit> <digit>
<digit>                 :: =  0 1 2 ..........9
<search profile>        :: =  <search term table> <search expression table>
<search term table>     :: =  <search term> <search term> <search term table>
<search term>           :: =  <term code> <term type> <term> <search term>'*'
<term code>             :: =  A  B  C ...........Z a  b  .............z
<term type>             :: =  C R S K T where C is class number; R, registry
                              number; S, subject term; T, substance name; and
                              K, keyword
<term>                  :: =  <letter> <letter> <char string>
<char string>           :: =  <char> <char> <char string>
<letter>                :: =  A  B  C ...........Z a  b  .............z
<char>                  :: =  Any character from the ASCII character set,
                              excluding control character.
<set>                   :: =  <search expression>5
<SE>                    :: =  <Boolean secondary>1 <SE> * <Boolean secondary>
                              <SE> - <Boolean secondary>
<Boolean secondary>     :: =  <Boolean primary> <Boolean secondary> + <Boolean
                              primary>  +
<Boolean primary>       :: =  <term code> (<SE>)
<term code>             :: =  A  B  C ...........Z a  b  .............z
```

Table 4. User profile

NATIONAL CENTRE FOR SCIENCE INFORMATION
INDIAN INSTITUTE OF SCIENCE, BANGALORE 560 012.

CURRENT AWARNESS SERVICE IN SCIENCE

USER PROFILE INFORMATION SHEET C 0 1 7 6

1. Name: P. BALARAM

2. Position: PROFESSOR

3. Department/Institution & University: MOLECULAR BIOPHYSICS UNIT IISC.

4. Mailing Address: MOLECULAR BIOPHYSICS UNIT IISC.

5. Area of Investigation: PEPTIDE CHEMISTRY, BIOLOGICAL MEMBRANES

6. Project Title: STUDIES ON PEPTIDES OF BIO-LOGICAL AND CONFIRMATIONAL IMPORTANCE

7. Name of Investigator: P. BALARAM

8. Sponsoring and Funding Agency: DEPARTMENT SCIENCE AND TECHNOLOGY

9. Duration of the Project: (Mention date of commencement) MARCH 1987

10. Current awareness service is presently being provided in the following disciplines. Indicate the discipline under which your profile is to be included. You may also indicate more than one discipline, if your project is inter-disciplinary:

PHYSICS
BIOLOGICAL SCIENCES
EARTH SCIENCES
MATHEMATICAL SCIENCES
CHEMICAL SCIENCES
ELECTRONICS
ELECTRICAL ENGINEERING
COMPUTERS AND CONTROL
INFORMATION TECHNOLOGY

(Use one proforma for one project. For additional copies, kindly duplicate this form).

11. Project Details : (Please underline important terms).

1. Objectives:

TO CARRY OUT SYNTHESIS AND CONFORMATIONAL STUDIES ON VARIOUS BIOLOGICALLY AND STRUCTURELLY INTERESTING PEPTIDES

2. Methods adopted, instruments used, applications envisaged:

PEPTIDE SYNTHESIS
HIGH PERFORMANCE LIQUID CHROMATOGRAPHY
NMR SPECTROSCOPY
CIRCULAR DICHROISM
X-RAY DIFFRACTION
STUDY OF PEPTIDE-LIPID INTERACTIONS

12. Give titles and references of any two published papers, which are directly relevant to your project:

1. Alamethicin; a rich model for channel behaviour. J.E. Hall, I Vodyanoy, T.M. Balasubramanian and G.R. Marshall. *Biophysical* Jl. **45** 1984,233-247.

2. Conformational analysis of a cyclin pentapeptide by one and two dimensional nuclear overhavser effect spectroscope. M.D. Bruch, W.J.H.Noggle and L.M. Bierasch.

13. List below subject terms to be used for computer search. Please indicate alternate terms/synonyms, wherever necessary.

Most important terms	Synonyms (if any)
1. PEPTIDE CONFORMATION	
2. TWO-DIMENTIONAL NMR SPECTROSCOPY	
3. MEMBRANE, CHANNELS	
4. PEPTIDE LIPIDS INTERACTIONS	
5. CHEMOTACTIC PEPTIDES	

Other terms	Synonyms (if any)
6. CIRCULAR DICHROISM	
7. SOLID PHASE PEPTIDE SYNTHESIS	
8. ALAMETHICIN	
9. POLYPEPTIDE STEREOCHEMISTRY	
10. SYNTHETIC PROTEINS	
11. UNUSUAL AMINO ACID RESIDUES	
12. ENZYME MODELS	

14. Suggest which of the above terms are to be considered alone and which to be considered together for searching. Give as many associations as you like. (Indicate the associations using term nos. For eg., 1 and 2; 2,3 and 6; 2,4,5 and 9; etc.):

i. 1 and 5
ii. 1 and 6
iii. 1 and 11
iv. 2 and 9
v. 3 and 8
vi. 4 and 8

1 and 2
3 and 4

15. If you are enrolling for the service in chemical sciences, please list:

(a) Section numbers of about 5 sections to which your research project belongs. The list of sections is enclosed. This is essential to provide service in chemistry.

(b) Registry numbers of chemical substances involved in your project. Reg.No. is a unique no. assigned to every chemical substance/compound indexed in 'Chemical Abstracts'.

Substance Reg.No:

16. How many papers are expected to be published in your research area per month?:

50

Dated: 24-3-1987

Signature : P. BALARAM

Table 5. Chemistry user profile input sheet

PNO: C 0 1 7 6

USER DESCRIPTION

Name : P. BALARAM
Designation : PROFESSOR
Department : MOLECULAR BIOPHYSICS UNIT
Institution : INDIAN INSTITUTE OF SCIENCE
Address : IISc, BANGALORE - 560 012

KEYWORDS(K) (User specified terms)

TCODE	TT	KEYWORD
A	C	006
B	C	026
C	C	034
D	C	075
F	S	Membrane
G	T	Mast cell degranulating peptide HR-II*
H	R	090986586

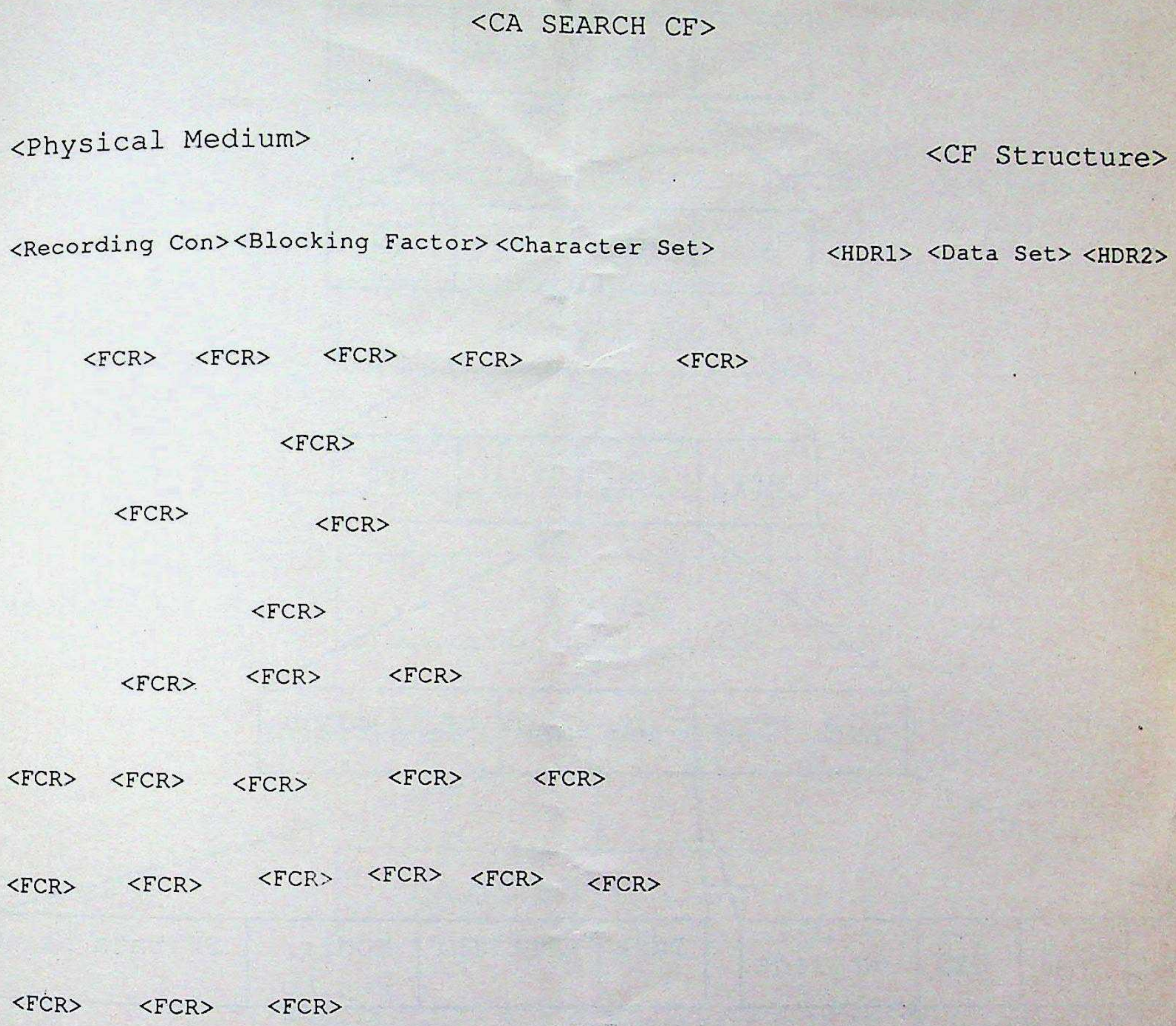
SUBJECT (S), SUBSTANCE (T), CLASSFN (C), REG NO (R) (Control terms)

TCODE	TT	Term
I	R	090986575
J	R	085902405
K	S	Circular dichroism
L	T	Alamethicin
M	R	027061785
N	S	Peptides
O	S	Synthesis
P	S	Stereochemistry
Q	S	Conformation and Conformers
R	S	Molecular structure-biological activity
S	K	Biological

SEARCH EXPRESSION

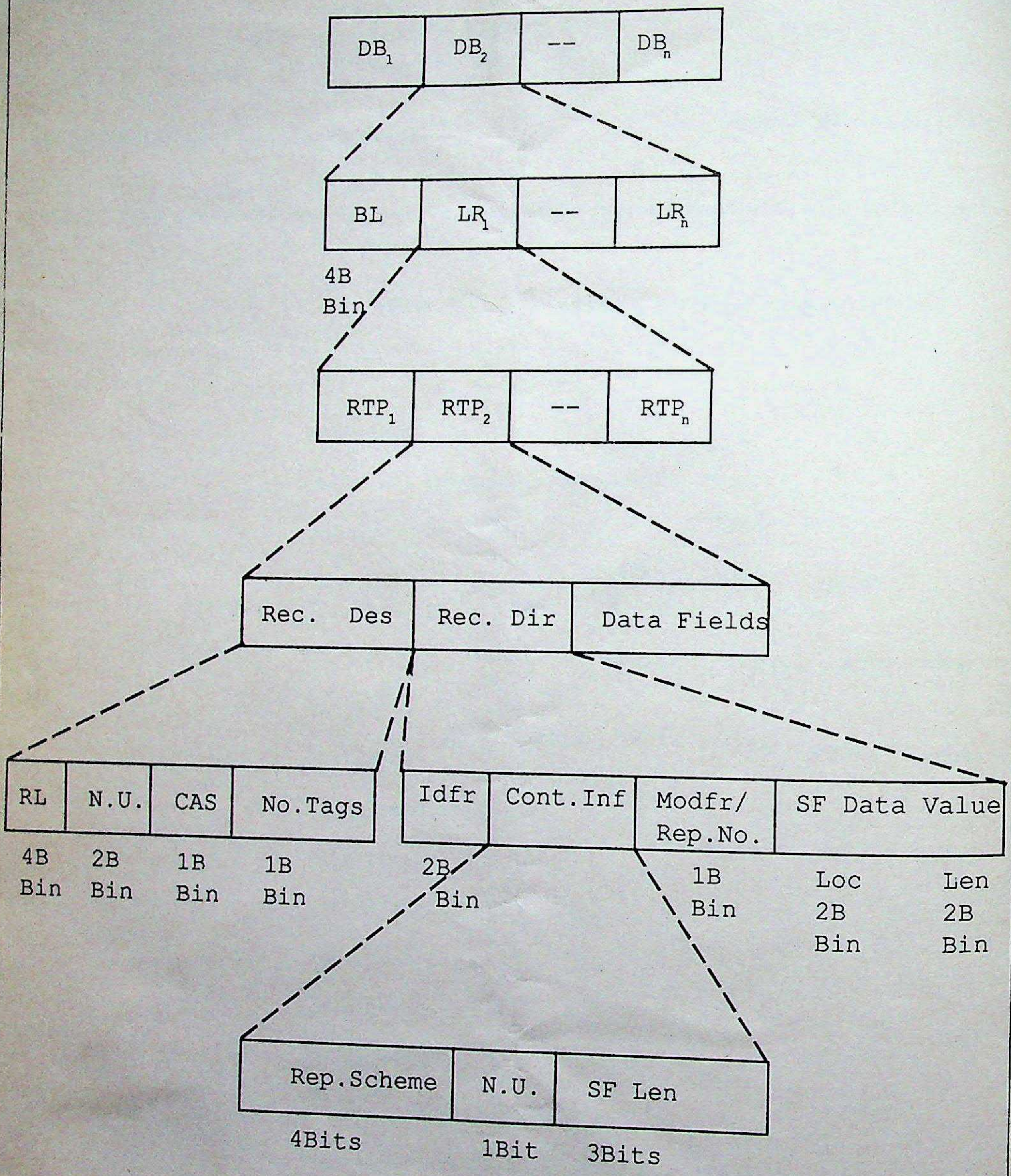
1. ((F*S) * (L + M))
2. (Q+R) * (G+H+I+J)
3. (N) * (O+P+Q+R+K)

Figure 1. Hierarchical View of Components of CA Search CF.



fgdf

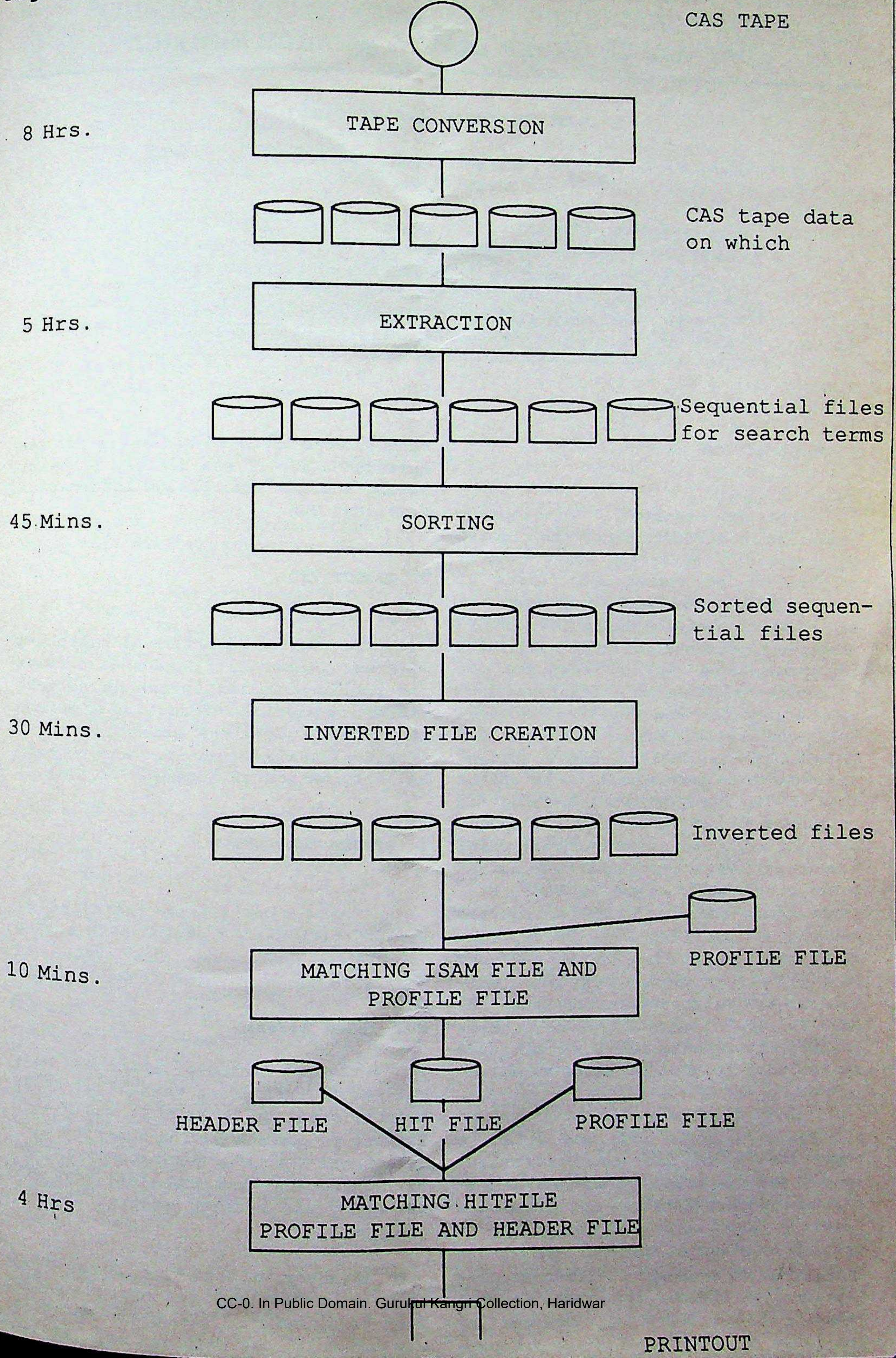
Fig. 2. Tabular view of a CA SEARCH data block


DB_1
DB_2
--
DB_n
BL
LR_1
--
LR_n
4B
Bin
RTP_1
RTP_2
--
RTP_n
Rec. Des
Rec. Dir
Data Fields
RL
N.U.
CAS
No.Tags
4B Bin
2B Bin
1B Bin
1B Bin
Idfr
Cont.Inf
Modfr/ Rep.No.
SF Data Value
2B Bin
1B Bin
Loc 2B Bin
Len 2B Bin
Rep.Scheme
N.U.
SF Len
4Bits
1Bit
3Bits

LEGEND

B	Byte	CAS	CAS use	NU	Not used	SF	Short form
Bin	Binary	DB	Data Block	RL	Rec. Len		
BL	Block Length	LR	Logical Record	RTP	Record Type		

Figure 3. System work flow


CAS TAPE
8 Hrs.
TAPE CONVERSION
CAS tape data on which
5 Hrs.
EXTRACTION
Sequential files for search terms
45 Mins.
SORTING
Sorted sequential files
30 Mins.
INVERTED FILE CREATION
Inverted files
PROFILE FILE
10 Mins.
MATCHING ISAM FILE AND PROFILE FILE
HEADER FILE
HIT FILE
PROFILE FILE
4 Hrs
MATCHING HITFILE PROFILE FILE AND HEADER FILE
PRINTOUT

ONLINE SEARCHING OF COMMERCIALLY AVAILABLE DATABASES UNDER DIALOG SEARCH SERVICE

AMBRISH KUMAR & A.K. TYAGI

Defence Scientific Information and Documentation Centre,
Delhi-110054

ABSTRACT: Problems encountered and their possible solutions found in searching DIALOG databases relating to the establishment of comunications link, payment in foreign currency and formulation of search strategies coupled with the behaviour of user scientists are discussed.

1. INTRODUCTION

Defence Research & Development Organisation (DRDO), one of the biggest R&D organisations in the country needs information on almost all facets of science and technology to augment its R&D activity. Defence Scientific Information and Documentation Centre (DESIDOC) functions as a central resource for disseminating scientific information to DRDO scientists and develops information systems for Defence science and technology. To fullfil these obligations towards user community an online interactive bibliographic information retrieval system (DRDO-IRS) was developed and implemented on in-house PRIME computers. Besides, producing normal bibliographical outputs such as catalogues and indexes the system has the capacity of creating inverted descriptor database. Database can be searched online by the user scientists themselves. The database created under the DRDO-IRS was to cater information needs on subjects ranging from high altitude agriculture to high altitude warfare.

Inspite of best efforts, the DRDO-IRS database could not come upto the expectations of the user community, mainly due to dearth of subject indexers and nonavailability of requisite hardware and software. However, to provide worldwide information to our scientists belonging to different disciplines, it became apparent that the answer lies in searching commercially available databases. Various database vendors were screened vis-a-vis our requirements and it was decided to enter into a contract with DIALOG Information Services, USA.

2. OBJECTIVES

To acquire expertise in searching external (commercial) databases on telex and public-switched telephone network (PSTN), to provide information on demand and also to feed the scientists on a continual basis scientific and technical information of interest to them.

3. SYSTEM COMPONENTS

The entire system installed at DESIDOC provides telex and PSTN access to DIALOG databases. The system is available to users about 22 hours a day.

3.1 Telex Access

DIALOG database searches were started in 1984 using mechanical teleprinter supplied by P&T. It was a slow machine to operate having numerous disadvantages viz. the separate operation of alphabetical and numerical keys and no memory and message editing facilities, etc.

However, at that time access other than telex (50 bps) was not available from India and full use of the facility was made till the PSTN was made available. Probably, DESIDOC is the first to replace the mechanical teleprinter with modern message communication terminal (MCT) imported from USA. These MCTs offer following facilities:

- Word processing facility for preparation, editing and correction of messages to be transmitted even as messages are being received;
- Programmable answerback;
- Edition keys with cursor control for, justification, insertion and deletion of characters and insertion and deletion of lines, etc.;
- Redial key for automatic redialing of a called number;
- Autoclear key to enable operator to attend to other functions after message transmission;
- Various built-in interfaces to suit different user requirements;
- Storage and use of message in any sequence with facility to store message for reviewing/editing, if required; and
- Built-in battery backup for protection from power failure.

The MCT comprises of:

- CRT visual display;
- Typewriter styled keyboard with CPU; and
- 12 needle NLQ Dot Matrix Printer.

Once the connection was made and search completed one or two records were printed online randomly to ensure that search strategy was correct. Wherever, it was possible the user scientist used to be present and inspect the record giving his approval of the search conducted. Thereafter, offline prints were ordered. After receipt of these prints a photocopy of the same was mailed to user and the original kept in library for use by others.

Though, this method of accessing databases solved the problem of information supply to DRDO scientists, it had the following inbuilt shortcomings:

- The whole of the information retrieved could not be supplied to the users instantaneously because of the prohibitive telecommunications cost;
- Since the DIALOG prints were to be received by post, our staff was always on a look-out for the typical DIALOG envelops, so that they are not taken away by others by mistake; and
- Though, it had happened only once or twice that DIALOG envelops containing off-line prints were lost, it created avoidable embarrasment to us. This was mainly due to delay in information supply to the scientists, who continue to throng our centre for obtaining the information. The demand for lost offline prints communicated to DIALOG always resulted in free duplicate prints.

Later on users were educated that downloading of hits could only be possible when PSTN or high speed data service through PDNS is available in India. Most of them were then agreed to have citations of hits online rather than getting full records offline incurring a delay of 10-15 days. However, some of the serious scientists agreed to wait for having full records with abstracts.

3.2 PSTN Access

On 14th August 1986 the Government of India started *international subscriber dialling* service to United States, thus, paving way for connecting DIALOG databases by one of the following ways:

- Direct distant dialing (DDD) -- the service which is available at 300 bps, half duplex and available round the clock; and
- Through DIALNET via British Telecom, London -- the service which is available both at 300 and 1200 bps, full duplex.

We have been able to logon to DIALOG computer at Palo Alto both at 300 and 1200 bps. However, it has been observed that the service is more reliable at 300 bps.

The service at 1200 bps requires a very good quality modem, noise-free channels and electronic exchange to which a telephone line is connected. It has been identified that 90% of the problems in logging on to DIALOG computer were removed when the communications problems between DTE (data terminal equipment) and exchange were removed. The problems were:

- Installing a good quality error correcting modem;
- Smoothing of the physical connection between DTE and telephone exchange;
- Connecting the telephone line to an electronic exchange; and
- Conduct searches between 1 AM and 5 AM in the morning when lines are less noisy.

4. EQUIPMENT AND SOFTWARE

4.1 Telex Access

Message communication terminal complete with printer and keyboards and stabilised power supply machines do not require air-conditioning and rigid environment control. They work within a voltage range of 190-270V, 40-60Hz and temperature 0-45ºC.

4.2 PSTN Access

4.2.1 Hardware

- IBM PC, PC/XT, PC/AT, computer or other IBM-compatible computers.
- At least 256K of RAM,DOS 2.0 or higher, and two double-side disk drives or a fixed disk system with at least one floppy drive are required.
- The modem must be compatible with your particular computer type. Modems may be internal or external to your computer. You must also have a serial interface card installed inside your computer.

4.2.2 Software

Communication software must be asynchronous and compatible with your particular computer.

5. EXPERIENCE

5.1 Logon Procedures

5.1.1 Telex Access

Though host computer can be connected by TYMNET, TELENET & UNINET, etc. given below is the procedure which is being folowed at DESIDOC:

- Switch on the MCT, ensure that printer, VDU and CPU all are activated.
- Press the call key and follow the following procedure

```
EDX ND 1-4 4052 23.06 14:22 GA
00+
GX ND 23.06 14:22
31780 DESI IN
GA
23231740+
RCA JUN 23 0454
RCA DATALINK
-2134:02-064-
PLEASE LOG IN:
```

(The underlined matter is entered by the operator).

After the word PLEASE LOG IN: type DIALOG2. After a few seconds the message appears on the screen informing that your MCT has been connected to host computer at Palo Alto. Longon procedure is in two steps, i.e., entering user number and entering the password.

Telex lines are vey sturdy; that they provide instant connection to DIALOG computer and virtually provide noise-free communication. But the disadvantage remains that the character entered via keyboard is transmitted to the host computer, therefore, one has to be extra cautious while entering the search parameters.

5.1.2 PSTN Access

5.1.2.1 Direct Distant Dialing

- Switch on your computer and modem, etc;
- Load DOS;
- Load communication software;
- Activate your modem;
- Set the communication parameters using modem panel switches and communication software;
- Dial 001-415-858-2382;
- Once the connection is made, you will get the CONNECT message on the screen;
- Press enter;
- You will get the "Enter Services" message on the screen; and
- Press D as terminal identifier.

5.1.2.2 Access Through DIALNET

- Set terminal to full duplex;
- Dial the DIALNET number 0044-1831-7322;
- After connection, enter 'A' as the terminal identifier;
- After enter service, type DIALOG2;
- After please logon, enter your DIALOG user number; and
- After enter password, enter your DIALOG Password.

5.2 Search Strategy

The formulation of search strategy is the core of the entire search system. The cost of the database searching and also the usefulness of the service depends on the effectiveness of search strategy.

We, in DESIDOC have designed special form on which the search request is obtained. The entire process is as follows:

- Obtain the search request on the prescribed form;
- Analyse the query with the help of thesaurus, secondary and primary publications on the subject;
- Use an indexing model for arranging the concepts;
- Interact with the user scientist with the search strategy; and
- Refine search strategy in the light of discussions held with the user scientist.

Though the above procedure demands very high degree of expertise in information handling and analysis on our part, in the process user scientists became virtual members of the search team.

6. BILLING

As per the contract signed between DIALOG and DESIDOC, the payments are to be made within one month of date of issue of invoice, in US $. This meant the release of foreign exchange for every invoice. We had to face a great deal of difficulty in dealing with Reserve Bank of India, who were not willing to accept that information is a comodity and one has to pay its price when purchased. Non-payment of bills in time means payment of 18% interest followed by litigation in USA. This was a very serious situation. Fortunately, we located M/s Informatics India (Pvt) Ltd., Bangalore who undertook the payment of the DIALOG bills for us. This resulted in increased number of searches as the payment aspect was looked after by this firm.

7. CONCLUSION

Online facility developed and implemented at DESIDOC is operational since 1984. During this period more than 400 searches have been conducted spending a few lakhs of rupees. At present the online search is costly due to the absence of a public-switched data network (PSDN) and reliable indigenous modems. It is envisaged that the PSDN based on PSS of the Department of Telecommunicationswill be made available soon, making the services more reliable and the high transfer data rate will result in reduction of search costs.

AKNOWLEDGEMENTS

We are extremely grateful to Shri SS Murthy, Director, DESIDOC for encouragement and providing necessary guidance and support for system development and implementation.

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ESTABLISHMENT OF CD-ROM-BASED INFORMATION SYSTEM - PLANS AND PROSPECTS

BALARAMA

Information Centre for Aeronautics, National Aeronautical Laboratory
Bangalore - 560 017

1. INTRODUCTION

It is a well-known fact that technological development in the field of computers and telecommunication and their confluence has made it possible to create computer readable databases, store them in a central mainframe and access from distant and remote locations. It is estimated that there are around 600 databases being operated online by international vendors like DIALOG, ESA/IRS, Pergamon, ORBIT, INFOLINE, BRS, etc., and access is provided through international networks like TYMNET, TELENET, ESANET, DIALNET, etc.

The online databases possess several advantages as a media for information storage, fast retrieval and distribution. The updating and periodical cumulation of data are quite simple with minimum time delay. The database producers, vendors and the end-users are quite happy with the system. New databases are being produced and added regularly to the existing online services in the field of science and technology and engineering.

With the advent of technological revolution in the field of optical storage media, spectacular advancements have been made in the field of compact disc technology, particularly, CD-ROM. Historically speaking, people looked to science and technology for solutions to specific problems, but in the case of compact disc technology, it is quite reverse: the technology is in search of publications. Publishers, conventional online database producers and operators, information technologists and scientists are all busy in finding various applications for this new media of storage and distribution of information.

The optical storage media, in general, can be grouped under four major categories:

- Video discs
- Compact discs (CDs)
- Optical cards
- Digital optical discs

The origin of development of compact discs with audio information can be traced back to video disc technology which started in 1950's and marketable products have appeared in 1970.

The compact discs can be grouped into three sub-categories viz. Compact disc digital audio (CDDA), compact disc interactive (CDI) and compact disc-read only memory (CD-ROM). In the case of CDDA, the audio information is coded and stored on disc in digital form, but at playback stage this is converted to analogue form and the audio signals are played back using amplifiers. The CDI is the disc where audio and video are recorded in addition to graphics and data in an integrated manner and used as such. This paper is mainly concerned with CD-ROMs'. CD-ROM has eventually became a new tool for the storage, retrieval and distribution of vast information. It can store and playback audio, graphic images, digital (ASCII) data and digital text. CD-ROM is a plastic disc, 4.72 inch in diameter with a storage capacity of over 550 MB which is approximately equal to 300,000 pages of text, or 1500 floppy discs, or 50 hard discs.

The online database producers, publishers, etc. involved in electronic publishing are taking keen interest in the new technology and producing their databases one by one in CD-ROM format, in addition to online version, which is termed as Optical Publishing.

The technology has come as a boon to library and information people in several ways. In the case of online access whether access is done through dedicated line or dial-up mode or telex line, there are three components of cost. One corresponds to telecommunication charges (satellite link, or STD/ISD calls, or telex link), second computer connect-time/database charges and third online/offline citation printing charges. These charges are totally eliminated in the case of CD-ROM system where only one time investment has to be made for acquisition of archival databases and updates which are available at a very cheap rate. Of course, investment has to be made in buying the associated peripherals but the investment is considerably low when compared to repetative online costs.

2. CD-ROM TECHNOLOGY AND PRODUCTION

The process of mastering and replicating, i.e., manufacturing CD-ROM discs and CDs are similar. The customer supplies the database to the manufacturer in video tape version for which CD-ROM format is required according to the manufacturer's premastering specifications. A glass master disc and a set of metal stampers which stamp out the replica discs are created in the clear room environment mainly to avoid disc attracting dust particles. The replica disc is made of polycarbonate material called Macrolon and this is prepared using injection molding, and a centre hole is made before removing it from the mold. An aluminium layer is then added to the disc's surface in a vacuum chamber to increase its reflectivity. To protect the aluminium layer from oxidation, scratches, etc., the disc is subjected to ultra-violet light after being coated with a plastic acrylic layer. Microscopic pits are created on the spiral tracks of the disc to store data. The spiral track actually starts from the centre of the disc and moves to outer most edge. On these tracks, machine-readable information is stored as a series of PITS (data) and LANDS (no data). The microscopic pit measure 0.5mm x 2mm x 0.1mm which is approximately 1/32 of the width of human hair and the total length of the spiral track is around 5 Km. The CD-ROM drives are designed to read the information contained on the disc by focusing low-powered laser beams on the pits. Reflection is measured by the optical unit of the drive and then it is translated into a binary signal which can be read by a computer.

As same production facilities are required for mastering and replicating both CDDAs and CD-ROMs, the CD-ROM discs can be produced rapidly at lesser cost. But, however, producing the first master is still highly expensive. The precision equipment required for this purpose costs millions of dollars due to which the mastering and replication is still not an in-house facility for most of the publishers and database providers who depend on few commercial producers like Philips, Sony, Toshiba, Hitachi, etc. Approximately. the cost of the production of single original master is between US$4000 to US$8000 depending upon the time frame. But the cost of the replicas ranges between US$8 to US$20 in quantities of 1000 to 5000.

Since CD-ROMs are read by a laser beam in the CD drive and also in read-only media with a thick protective coating for eliminating any physical contact of the laser head with the disc surface, they can last for a minimum of 10 years.

3. CD-ROM DATABASES

The firms and organisations dealing with CD-ROM technology can be grouped based on the following different activities in which they are involved .

- Manufacuring CD and CD-ROM discs;
- Development and marketing search and retrieval software;
- Manufacturing CD drive/player, interface, etc.;
- Publishing databases in CD-ROM format (own product); and

Providing consultancy in data preparation, standardisation, market research, etc.

This grouping is not mutually exclusive. A single firm may be dealing with more than one category. However, this paper is concerned with manufacturing CD-ROM discs and publishing databases in CD-ROM format respectively.

Several online database producers and publishers have already started producing their products both in online and CD-ROM formats. However, the production of CD-ROMs is handled by a few professional manufacturers who have invested huge sums of money particularly in Japan and European countries. But a few publishers ventured to put up manufacturing plant for the production of their own products in CD-ROM format.

Roughly, there are around 100 databases in CD-ROM format covering the field of science and technology and engineering. A list of selected databases is furnished in the Appendix 1.

Normally, the CD-ROM databases started only from 1983-84 but in a few places from 1975-80. The normal procedure followed in offering these databases to the user is to provide one archival disc containing past 4-5 years literature as the case may be and additional current discs with quarterly updates. Some producers are offering current discs with cumulation and some without. The main drawback of the database is that since it is in read-only media, no updating and cumulation can be done on the same disc. The old disc has to be returned to the supplier and in turn the producer will supply new one with updating and cumulation. The cost factor involved in this process becomes exorbitant if cumulation is acquired with each update.

The workable solution for this is to buy the initial archival disc by investing US$1500 to US$2000 and its quarterly updates on separate discs costing only US$10-US$15 per disk. This can be done for a period of 1-2 years and then new cumulation can be bought. In this regard even cooperative acquisition also may be thought of.

The most important issue concerning CD-ROM databases is standardisation. Lack of compatibility will inevitably lead to excess cost where the user has to buy several hardware and software facilities to operate the system. The Phillips/Sony Red and Yellow books have been more or less accepted as technical standards for both CDDA and CD-ROM. The High Sierra Group comprising of 12 leading manufacturers of computers and software in the world and the Compact Disc Data Format committee set up by NISO, USA, have prepared standards based on Phillips/Sony standards. But, still there are a few areas where standardisation is yet to be finalised. They are the file structure, i.e., how the information is orgainsed on the disc, the hardware and software interfaces between the drives and computers, etc.

4. SELECTION OF CD-ROM DRIVES AND INTERFACES

Ever since the CD-ROM was launched in January 1985, tens of thousands of CD-ROM drives have been manufactured and sold by internationally reputed manufacturers like Denon, Hitachi, Sony, Sanyo, JVC, Phillips, Panasonic and Toshiba. Two characteristics, viz., access time and transfer rate are important for selection of any CD drive. Access time (AT) is the time taken for the laser head in the drive to position itself for reading the data on the disc and the transfer rate (TR) is the time taken to transfer data from the drive to the computer.

The AT and TR of three different categories of disc drives are as follows:

Disk drive	**AT(sec)**	**TR(kb/sec)**
CD-ROM	0.5-1.0	153
Floppy	0.10	63
Winchester	0.05	625

This shows that CD-ROM drives have slower access time when compared to other two types. But, however, this becomes an unnoticeable factor when the user is actually searching CDs in the drive. As far as TR is concerned, the CD-ROM is faster than floppy but slower than Winchester.

Other important characteristics of the drives to be considered are:

Latency: Inner - 70 ms, outer - 150 ms, seek time (track to track) - 1 ms, spin-up time - 1-2 sec; and rotational speed - 200-530 (CLV)

Latency means the time taken for the disc to rotate to a desired position. On the inner edge each revolution takes about 70 ms and the outer edge 150 ms. The pick up mechanism is handled by the tracking servo, which must "seek" to any desired track on demand. Normally, drives should not take more than 2 seeks to go to any desired track. The spin-up is the time for a drive to achieve the desired rotational speed. To achieve constant linear velocity (CLV), the speed of the drive must vary from 200 rpm (when data on the outer edge is read) to 530 rpm (when data on the inner edge is read).

The drive comes as a stand-alone or built-in variety. In the stand-alone system, which is widely preferred, drive comes with top loading or front loading facility. However, this does not make any difference in the total performance of the machine. If more than one disc (for example, a multi-volume set) is to be accessed frequently or simultaneously, several drives have to be connected. This is possible through daisy chain connection for which the manufacturer has to provide facility in the product.

Since most of the drive manufacturers have followed the standard specified in Philips/Sony Yellow book the performance characteristics of most of the drives are more or less similar to each other. Therefore it becomes necessary to consider other factors for selection of drives, viz., cost, interface requirements and product availability. The cost of the drives is coming down drastically and now it ranges between US$550-1200.

The interface connects the drive to the computer to enable the latter to specify a sector (data block) number to the CD-ROM drive. After a sector is specified, the drive begins transferring the data to the computer in a serial fashion. It is, therefore, essential to note that the selection of the drive depends upon the computer system to which it is to be connected. Each drive is actually designed to operate with specific interface connections. Normally CD-ROM drives have PC interfaces. But drives have other interfaces also viz., compact disk digital audio (CDDA), Shugart Associates System Interface (SASI), Small Computer System Interface (SCSI--pronounced 'scuzzy') and customised interfaces. A few examples are as follows:

Drives	**Interfaces**
Denon	SCSI
Hitachi	PC
JVC	SCSI
Phillips	PC
Panasonic	SASI & PC
Toshiba	SCSI

Most of the interfaces are parts of the CD-ROM drive package, although some must be purchased separately. SCSI interface possesses several advantages over others and can also be connected to IBM PC/XT/AT compatibles which have SCSI controller.

5. SOFTWARE FOR CD-ROM

Search and retrieval software for interrogating CD-ROM databases are loaded in the drive and connected. There is one major difference between the retrieval software used for online retrieval and the PC through interface. The former must be of generic nature irrespective of the online databases produced by different producers. The users must have only one retrieval software for interrogating different databases through a particular online vendor. Different online vendors may have different retrieval softwares, but, different databases acquired and operated by the same vendor must have a single software. In CD-ROMs there is no restriction of generic type and that is the big advantage of CD-ROM-based system. Each producer can have one single software for all databases produced by them and the same can be recorded on the respective CD-ROM discs or issue it on a separate floppy.

There are some 20 major companies producing software packages for the search and retrieval of their respective databases. Some of them are as follows:

Batelle	-	Micro BASIS (available on MSDOS & UNIX based systems)
BRS	-	BRS SEARCH
TMS Inc.	-	Laser-DOS
DEC	-	Uni-File
Reference	-	Standard Access and Format (STA/F) Technology, Inc.

Some application software programs are available for CD-ROM for full text search and retrieval. Several firms are developing high-level, sophisticated, microcomputer fulltext search and retrieval programs. Some of the firms are using natural language approaches, such as Quantum Development Corporation, Knowledge Management System (KMS).

6. MANUFACTURERS AND SUPPLIERS OF HARDWARE & SOFTWARE PROCUREMENT

The equipment, software and other peripherals required to establish complete CD-ROM based system are given in Table1.

If the PC and printer are already available, the total cost is reduced to approximately Rs. 1.7 lakhs which includes subscription to 4 CD-ROM discs (say NTIS, COMPENDEX, MEDLINE, and CAS). M/S Silver Platter is one of the major companies who is not only manufacturing CD-ROM products, but also a major international supplier in USA. M/S Informatics India (P) Ltd., Seshadripuram, Bangalore, is their agent in India.

6.1 Procurement

The IBM PC/XT compatibles and printers are available in India from various computer manufacturers, viz., ESPL, WIPRO, SIVA, HCL, DCM, BPL, etc. The selected CD-ROM discs may have to be purchased from the concerned database producer or through Silver Platter Co. The other items to be bought are CD drive, interface and software. Before placing order, necessary import licence is to be obtained from the Chief Controller of Imports and Exports (CCI&E), Delhi by applying in the prescribed form by clearly indicating the end-use and end-user along with estimated cost in foreign exchange. After receiving the necessary licence, foreign exchange clearance is to be obtained from the concerned ministry for the purpose of making remittance to the supplier.

Necessary purchase order is to be placed on the supplier and after receiving the proforma invoice, and irrevocable letter of credit (LC) has to be opened in the bank (customer banker) after necessary clearance of RBI which can be obtained on production of necessary import licence and FE approval.

If these procedures are followed properly, the customs clearance will become smooth and on payment of prescribed duty the material can be got released without undue delay.

Table 1

Item	**Cost (US$)**	**Nos.**	**Rs.**
IBM PC/AT or its compatible		1	50,000
CD-ROM drive	(1000 + 200% duty)	1	45,000
Standard interface (SCSI, SASI, etc)	(200 + 200% duty)	1	9,000
Search and retrieval software	(400 + 200% duty)	1	18,000
Dot matrix/letter quality printer		1	20,000
*CD-ROM discs	(1500)	4	90,000
TOTAL			2,32,000 (say Rs.2.4 lakhs)

* Cost given is for each first archival disc (say for 4-5 years) and subsequent quarterly updates for 2 years without cumulated CD-ROM discs.

7. CD-ROM BASED INFORMATION SERVICE

The information services that can be provided to the users after the system is established are described below.

7.1 Current and Retrospective Bibliographic Search

The general usage of all databases irrespective of their format is to provide relevant references on specific topic of interest with high recall and precision. There is not much difference in online searching and on-disc searching. Infact, CD-ROM searching gives more freedom to the user in formulating search strategy and conduct experiments with different strategy as time is not a factor when compared to online searching. The search may be conducted on the archival disc or current quarterly updated disc or both as the case may be. By investing a little extra money, 2-3 CD drives can be interconnected in series using daisy chain and multiple discs can be searched simultaneously.

7.2 Individual or Group SDI Service

The topic or topics of interest for SDI service for an individual or a group is to be analysed properly and a user profile has to be prepared. This profile can be permanently stored in the PC. It is possible to store several such profiles corresponding to different individuals and groups, but, with unique tag for the purpose of identification. As and when updated discs are received, the user profiles are to be executed, one by one, using necessary commands and matched with the data on the disc. The hits, if any, will come out on the display. The hit references can then be printed. If there are no hits, nil references are also to be printed for the purpose of communicating to the requestor.

7.3 Patent Search Service

Several users are interested particularly on patents on a specific topic. All accepted patents are published and appear in the WORLD PATENTS INDIX (WPI) database. This database can be regularly searched for a patent on the desired topic.

7.4 Theses Search Service

The MS and PhD theses submitted to various universities throughout USA and other countries are regularly covered in Dissertation Abstracts International (DAI) by UMI and British Reports, Theses and Translations (BRIT) by BLDSC, UK respectively. The DAI is currently available in CD-ROM format. US Theses can be searched and retrieved against specific requests from users.

7.5 Full Text Retrieval Service

This is one of the greatest advantages of the CD-ROMs as the databases which carry full text can be used to get the retrieved references printed with complete text without incurring additional expenditure. If this has to be done on online, it will cost lot of money because of database, citation printing and telecommunication charges. One more cost saving factor for CD-ROMs is that full length xerox copy of the original article need not be purchased at all.

7.6 Other Usage of CD-ROM Databases

There are two important reference tools from RR Bowker Co., viz., Books in Print Plus and Books out of Print Plus in CD-ROM format. These can be used for:

- Retrieving information about author, publisher, cost, etc., of a specific title;
- Retrieving information about different books published on a specific author, by a specific publisher/subject, etc.; and
- Whether books mentioned at above are available or out of print.

There is another reference tool called Ulrich Plus. This can be used for:

- Ascertaining publisher, cost, periodicity, language, etc., of a specific journal/serial; and
- Ascertaining the journals/serials currently being published with cost, periodicity, etc., on a specific subject.

8. ADVANTAGES AND LIMITATIONS OF CD-ROM SYSTEMS

8.1 *Advantages*

- The telecommunication, computer connect time/database and citation printing charges are all totally eliminated in CD-ROM systems. Though initial investment is to be made for CD-ROM databases, drives and other peripherals, it is one-time payment and the recurring expenditure for buying updates is negligible.
- Very high storage capacity (550 MB per disc), extremely light weight, miniature size and very cheap cost (updates) make the CD-ROM discs highly attractive for handling and operation.
- There is no restriction on access time. The CD-ROM discs can be operated repeatedly without incurring any additional expenditure.
- They are durable media and tolerate rough handling and last for a minimum of 10 years.
- As CD-ROMs can have different search and retrieval software and the same can be stored on the same disc therefore it gives complete flexibility to the software developer and ease of operation for the user.
- Several discs can be searched simultaneously using number of CD drives connected using daisy chain.

8.2 *Limitations*

- Though several discs can be searched by a user, multi-user approach is not possible therefore connecting a central CD-ROM system to a local area network (LAN) is ruled out.
- Since it is a read-only media, the updating and cumulations are to be done on a fresh disc only. Therefore the customer has to bear high expenditure whenever updated and cumulated discs are required. However, since WORM, DRAW and other optical discs are still in R&D stage, CD-ROMs must be continued to be used with the existing drawbacks.
- Data access time is slow when compared to floppy disk and winchester disk. However, the transfer rate (153 kb/sec) is little higher than floppy (63 kb/sec) but lesser than winchester (625 kb/sec).

9. CONCLUSIONS

There is absolutely no doubt that CD-ROMs definitely possess several advantages over online databases and can be acquired and used profitably despite their limitations. To overcome the problem of substantial initial investment, cooperative acquisition among a few libraries may be resorted particularly to acquire the first archival set of CD-ROM databases. If twenty discs are shared by at least 5 organisations, a lot of initial investment can be saved as the subsequent updates cost very little money. Several important reference tools like encyclopaedias, dictionaries, international directories and who is who, periodicals directories, etc., are all appearing in CD-ROM formats. There is immense advantage in saving storage space, fast retrieval and providing search service to the users.

Therefore it is high time to recognise the usefulness of this new tool which can be acquired and established to gain experience and also to provide effective service to the users.

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APPENDIX I

LIST OF DATABASES IN CD-ROM FORMAT

	Name	***Producer***
1	AGRICOLA/CAIN	Silver Platter Information Inc., 37, Walnut Street, Wellesley Hills, MA 02181, USA.
2	AV ONLINE	Silver Platter, USA.
3	BOOKS-IN-PRINT PLUS	RR Bowker Co., 205 E 42nd Street, New York, NY 10017, USA.
4	CANCER-CD	Silver Platter, USA.
5	COMPENDEX: Aerospace Engineering	Digital Equipment Corporation (DEC) CD Publishing Services, 12 Crosby Drive, Bedford, MA 01730-1493, USA.
6	COMPENDEX:Chemical Engineering	DEC, USA.
7	COMPENDEX:Electrical & Computer Engineering	DEC, USA.
8	COMPU-INFO	Silver Platter, USA.
9	Dissertation Abstracts Ondisc	University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106, USA.
10	ERIC	Silver Platter, USA.
11	GPO	Silver Platter, USA.
12	LISA	Silver Platter, USA.
13	MEDLINE	Silver Platter, USA.
14	NTIS: Aeronautics, Aerospace and Astronomy	DEC, USA.
15	NTIS: Computers, Communications and Electronics	DEC, USA.
16	OSH-ROM	Silver Platter, USA.
17	Science Citation Index on CD-ROM	Institute for Scientific Information, 3501 Market Street, University City Science Centre, Philadelphia, PA 19104, USA.

COMPACT DISC TECHNOLOGY AND ITS USE IN BIOINFORMATICS

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1. INTRODUCTION

Post war era has seen a number of technological advances such as computers, communications, lasers, etc. The advent of computers has revolutionised the field of information technology. The first generation computers using valves required considerable space and power for relatively low computing capability. The development of chip technology and integrated circuits have brought out the next major changes. The personal computer now used extensively has high capacity magnetic storage and computational power of a mainframe available in 1971. Today centralised computer systems can store large databases of the order of 30 gigabytes or more. These can be accessed interactively through terminals located at remote sites via satellite and telecommunication links or via local area and wide area networks.

2. CD-ROM (OPTICAL MEMORIES)

The exciting emergence of compact disc read-only-memory (CD-ROM) for information storage is the direct outcome of the compact audio disc - the immpressively successful new consumer format for the distribution of music. The technology behind all the modern products for the optical storage of digital data comes not from the computer industry but the consumer electronics.

During the late 1960's and early 1970's, television manufacturers around the world worked to develop home video disc systems, as television accessories. Videodisc was intended, as a read-only system using mass-produced discs. In 1980, Sony Corporation and Philips Co. developed the optical digital audio systems named compact discs (CDs) for music and marketed the audio CD players in 1982. Simultaneously, efforts for development of data storage on video discs were also taken up in 1980. Philips brought out video discs for data. Other manufacturers put in efforts for developing optical discs to interface with computers and by 1983-84, CD-ROM had become a commercial reality.

2.1 The Basics of Optical Memories

A CD is a thin, flat circular object made of aluminium material. A highly collimated laser beam tracks the spiral of pits as the disc rotates. The pits distort the beam and the disc's surface reflects the light to a photoelectric cell. As the pits pass through the beam, they modulate the light and the cell converts these fluctuations into electrical signals. The pits convey a train of pulses for digital data.

By the use of extremely collimated and fine focussing of laser, the optical discs are able to hold enormous amounts of information. They have typically 10,000 to 20,000 laser created tracks per inch compared to less than 100 for magnetic discs.

2.2 Comparison of Memory Devices

Table 1 shows the comparison of various memory devices.

The surface of the disc can be protected from physical damage such as scratches and finger prints by using a transparent lacquer coating.

An optical disc of size $5^{1}/_{4}$" has a capacity to store approximately 600 MB of information and uninscribed disc costs $2. A floppy disc of the same size can store 1

Table 1

Product	Memory devices			
	Optical disc	Magnetic tape	Magnetic disc	Microform paper
Direct writing access	Yes	Yes	Yes	Yes
Recording modification capacity	No	Yes	Yes	No
Reusable media	No	Yes	Yes	No
Recording life time in years	>10	2-3	2-3	>10
Storage density in bits/cm^2	10^8	10^5	10^6	10^3-10^4

MB of information and costs about US$2. Thus the cost of storage medium per bit on optical disc is significantly less than that of magnetic disc.

- To post a magnetic tape containing data similar to optical disc is very expensive. Optical disc is very light and safe for exchange of information for mailing.
- The optical media commercially available today do not provide modification, updating or erasing of the data which the magnetic media provide.
- Currently two kinds of optical discs are available:
  - Read-only memory: CD-ROM
  - Write once read many times memory (WORM)

Prototypes of eraseable optical discs under development are available and commercial production is awaited. These will enable large data to be recorded and erased similar to magnetic disc or tape.

2.3 Varieties of CD-ROM

The discs of varied sizes which are commercially available are as follows:

- 4.72 inch diameter (12 cm) compact discs;
- 5.25 inch diameter (13 cm) CD-ROM/WORM for small systems/eraseable optical systems (popular format as modelled on winchester discs);
- 8 inch diameter micro video discs for consumer application;
- 12 inch diameter video disc-first generation recordable digital optical disc aimed at data archieving and document image storage market; and
- 14 inch diameter disc based on mainframe winchester and aimed at mainframe data storage market.

2.4 Descrption of CD-ROM

A CD carries a single spiral track originating at the centre of the disc and working its way outwards. The turns in the spiral are microscopically close together--16000 of them per inch, of compared to a couple of hundred on a hard disc. The flat surface of the disc is called 'land' Tiny grooves (called pits) are physically sunk into the land during the disc processing as for a phonograph record but with far higher precision.

The track is divided into sectors of exactly the same length each containing usually 2K bytes of data. When in operation, the laser in the CD drive starts reading data from the centre of the disc at the rate of 75 sectors (or 150K bytes) per second. The laser is mounted on a reading head that moves radially outward from the disc's centre, and the disc spins under it, allowing the laser to follow the spiral. To maintain the 75 sectors per second rate as the loops of the spiral get longer, the disc moves at constant linear velocity (CLV). The information on a CD-ROM is accessed by using a CD-ROM drive, which is connected to a microcomputer in the same way as any other peripheral. The CD-ROM users can use search and retrieval processes with minimal training.

3. MECHANISM OF DATA INSCRIPTION ON CD-ROM

It is a four step process.

3.1 Data Generation

Data generation is normally carried out by the provider of information. During this phase, all material to be included on the disc is recorded digitally on magnetic tape. The task, in essence, is to organise the sections, chapters, paragraphs and indexes of the material so that the retrieval software can later access it from the CD-ROM. When this has been accomplished, an inverted database is created. During this process, an index of key words for searching and retrieval procedures is also created.

3.2 Data Preparation

Data preparation involves the restructuring of the recorded information into a standard format. This is an important step carried out by the software specialist and information provider. On a magnetic tape search and retrieval software, system software and inverted files are combined to produce a mirror image of data to be inscribed on CD-ROM.

3.3 Mastering

Mastering begins by encoding the information into the final CD-ROM format. This is then recorded optically and the disc master carrying the data in the form of billions of micronsize pits, is ready for the replication step.

3.4 Replication

The master disc is replicated on to aluminium discs with a protective layer of lacquer.

4. READING CD-ROMS

The CD-ROM player operates on the principles of audio players. Infrared laser diode is used to read data on CD-ROM. On the drive when the laser beam strikes the surface and hits a pit, light is scattered and the data is converted into series of pulses. Phillips is producing disc drive readers for IBM PC, XT and ATs. The CM100 Disc Drive for these machines costs US$1200 and the necessary CM156 Board Format Controller for it costs US$1000. An RS232 interface is required to connect the CD-ROM reader and controller to the host computer system. The data transfer rate is 1.4MB per second. Typical access time of the reader is one second.

5. APPLICATIONS OF CD-ROM

Since first generation CD-ROM drives were introduced into the market in November 1984, more than 150 different software packages have become available from a variety of vendors. Most products offered to the user community tend to be subsets of existing online databases such as MEDLARS, CANCERLINE, CHEMLINE, COMPINFO, British & International Standards and Books In Print, and replications of multivolumed encyclopedias. They give hope to many librarians, who are anxiously awaiting the day when multiple databases can be accessed from the library by the scientific researchers for high level research and technical developments in an organisation. Table 2 shows databases available on CD-ROM in the field of bioinformatics.

As an example, technical databases on CD-ROM are being extensively used in research institutional libraries in US. The Library Corporation's Bibliofile uses five CD-ROMs to distribute Library of Congress cataloguing data. Bibliofile is now used in over 250 libraries all over the world.

6. STANDARDISATION

Lack of standardisation is one of the drawbacks of CD-ROM technology. Each organisation puts data on discs and what is inscribed can be used only on one system. Data on discs that can be used on Soni cannot be read through the Philips player. So also file management standards differ from vendor to vendor and since the databases are marketed along with the software to be used on a particular machine by each vendor, it has been found that a user having different kinds of databases needs different discs drives for each CD-ROM. There is also no standardisation in retrieval software.

Since CD-ROM technology is still in experimental stage, problems such as standardisation of discs compatible to all types of players and standardisation in software have to be clearly resolved if this technology has to reach a large user community. Access and retrieval time is also very slow and this mechanism needs to be improved.

7. EXPECTATIONS

- At present one CD-ROM can be accessed by a single user only. It is necessary to develop a multi user environment and also a CD-ROM network system.
- Development of mixed databases which can combine fine text graphics, images and numerical data will make this technology much more useful.
- Incorporation of features such as expert systems for data queries will be advantageous in decision making processes.
- Read and write compact disc will enable appending data and addition of information similar to a floppy or hardware disc which will make this much more attractive.

8. USER EXPERIENCE

At the National Informatics Centre (NIC), biomedical information group is successfully using MEDLARS and CANCERLINE databases on compact disc for information retrieval. The data is updated quarterly and at present MEDLARS and CANCER-CD are available to users and proposes to acquire Occupational Health and Science Citation Index databases in the near future.

For developing countries such as India where on line access via telecommunication and satellite links are prohibitively expensive, compact disc offers a less expensive alternative. Yet in the final analysis, if information has to reach a large number of user groups across a nation such as India, the answer still is to acquire databases on tapes and use them on central mainframe computer systems with multiple access via satellite links such as NICNET.

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Table 2 - Laser Disc Directory for Bioinformatics

Updates in Quarterly
Updates in $

Product Name	Company	Compatibility	Price with	Status
01. Chemical Abstract	Digital Equipment Corporation (DEC) IBM PC XT	DEC Reader: Micro Vax I, II, VAX Station II,	1195/Yr	Currently available
02. COMPACT Cambridge Life of 256 K	Cambridge Scientific Abstracts	IBM PC and Compatibles with a minimum	3650/Yr *	Ist Quarter 1986
03. COMPACT Cambridge/ MEDLINE	Cambridge Scientific Abstracts	"	6350/Yr *	Currently available
04. Computerized clinical system	Micro medex, Inc	IBM PC with minimum 51 LK and 10 MB hard disk drive	6000/Yr *	"
05. NTIS:Environmental Health and Safety	DEC Station II, IBM PC, X7	DEC Reader: Micro VAX I, II, VAX	1150/Yr	"
06. Royal Society of Chemistry:Current Biotechnology Abstracts	DEC	"	1395/Yr	"
07. SearchLITE (Search via laser Information Technology)	I.S.Grupe	"	"	"
08. Onco Disc (for PDQ, NCI Cancer treatment CANCERLIT)	I.S.Grupe	"	"	"
09. Science Citation Index Scientific Information, Philedialphia	Institute of	"	"	"
10. NTIS:Medicine Healthcare and Biology	DEC	"	1150/Yr	"
11. EMBASE Database on Silver Platter	Silver Platter Information, Inc	IBM PC and compatiables	8000/Yr	Available
12. PSYCLIT Database on Silver Platter	"	"	5000/Yr	"
13. Medline Database on Silver Platter	"	"	2500/Yr	"
14. CANCER-CD	"	"	2700/Yr	"
15. CHEM-BANK	"	"	1485/Yr	"
16. Consume Drug Information on Disc	Knowledge Access, Inc	"	Not determined	"

* Include price of CD Driver

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Shri Sube Singh
Documentation Officer
INSDOC, 14, Satsang Vihar Marg
New Delhi-110067

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PID, Dr. K S Krishnan Marg
New Delhi-110012

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ASSOCIATION OF GOVERNMENT LIBRARIANS & INFORMATION SPECIALISTS

(Formerly Government of India Librarians Association—GILA) (Regd.)

Objectives

The objectives of the Association are :

(1) To work for the advancement of library and information science.

(2) To promote the application of progressive ideas and information technologies in library an information work.

(3) To formulate standards, norms and guidelines for the library and information work.

(4) To develop appropriate mechanisms for resource sharing among government libraries an information centres and establish linkages for cooperation with national and international bodi engaged in the promotion of information work/services.

(5) To provide consultancy in library and information activities.

(6) To improve the professional calibre of the working personnel by engaging education pro grammes, holding professional conferences/seminars and publishing professional literature.

(7) To foster a sense of dedication among the members for upholding professional ethics and servic to the users.

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6 November,1989

MESSAGE

I am happy to know that the Association of Government Librarians & Information Specialists is organising a seminar on Management of Libraries and Information Centres at Goa University from 11-13 November, 1989.

I send my best wishes on the occasion.

(KHURSHED ALAM KHAN)

SEMINAR ON MANAGEMENT OF GOVERNMENT LIBRARIES AND INFORMATION CENTRES, 11-13 NOVEMBER 1989, GOA UNIVERSITY, GOA

PROGRAMME

Saturday, 11 November 1989

10:00 - 13:00	Registration
13:00 - 14:30	Lunch
14:30 - 17:00	Inaugural Session **Welcome Address : Shri VR Navelkar** **Chief Librarian, Goa University Library** AGLIS--Activities & Achievements: President, AGLIS **Inaugural Address :** Shri RS Sethi Development Commissioner, Government of Goa Chief Guest Shri R S Sethi Development Commissioner Government of Goa **Vote of thanks :** Shri SN Mehta Secretary, AGLIS

Sunday, 12 November 1989,

10:00 - 13:00	**Technical Session-I** **Chairman** : Shri NV Satyanarayana Managing Director, Informatics (India) Pvt Ltd., Bangalore
13:00 - 14:30	Lunch
14:30 - 17:00	**Technical Session-II**

Monday, 13 November 1989

10:00 - 13:00	**Concluding Session**
13:00 - 14:30	Lunch
14:30 - 17:00	Visit to National Institute of Oceanography, Dona Paula, Goa

VOTE OF THANKS

S.N. MEHTA
Secretary, AGLIS, Delhi-110 054

Pleasant duty of proposing vote of thanks has fallen on me being the Secretary of the Association of Government Librarians and Information Specialists (AGLIS).

First of all, we are really indebted to Dr. Sheikh Ali, Vice-Chancellor of Goa University who kindly agreed to be here with us inspite of many engagements. We are also indebted to him for providing us all the facilities to run a training programme of CDS/ISIS Version 2.3 in Library Management and also to hold the Seminar on Management of Government Libraries and Information Centres and made Shri V.R. Navelkar, Librarian, Goa University Library as Convenor of the Seminar and also agreeing to be the Chairman of the Organising Committee.

We are also grateful to Shri R.S. Sethi, Development Commissioner, Government of Goa, who very kindly agreed to be the Chief Guest for today's function and is with us inspite of having a busy schedule.

We are indebted to Dr A. Lahiri, Director, NISSAT for providing the financial assistance.

Our special thanks are due to Shri M.P. Tapaswi, Documentation Officer, National Institute of Oceanography (NIO), Dona Paula.

We are also thankful to the Heads of various Departments who have deputed their professionals to participate in this Seminar.

We are thankful to the authors of various papers to be presented in the Seminar and to the participants whose active participation will enliven this Seminar.

I must thank the members of the Goa University, NIO, DESIDOC and the Executive Members of AGLIS who actually worked for the success of this Seminar.

In the end I thank all of you who have graced the occasion to make this function a success.

NETWORKING CD-ROMS

N.V. SATHYANARAYANA
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1. CURRENT CD-ROM SCENARIO

Costs of both discs and drives are steadily declinig. Whether this will happen in India too, will depend on how much we need CD-ROMs and how liberal our fiscal laws and regulations are in encouraging this medium. In comparative terms, currently CD-ROM is the cheapest storage medium. Figure 1 illustrates this.

The drive industry has grown more quickly than the availability of CD-ROM discs[1]. Currently there are over a dozen major manufacturers of drives. The drive population has gone up from 20,000 in 1986 to the current 150,000 plus. The average cost per drive is in the range of US$700 to 800. Innovations are fast taking place in improving the performance efficiency of drives in terms of access time, seek time, etc. PCs with built-in CD-ROM drives are a common sight now. Portable CD-ROM drives have already hit the market. NEC of Japan has recently introduced smallest portable CD-ROM drive weighing less than half a kilogram. This was an exhibit in the recent CD-ROM Expo 1989 at Washington in October 1989. COMPAQ, known for its lap-top PCs, has already introduced its lap-top model CDX-7000 whis is a portable 386 with built-in CD-ROM drive[2].

CD-ROM database publishing acitivity is growing faster than the growth of online databases. Between 1985 when the first six prototype CD-ROM titles were exhibited by Silver Platter at 104th ALA Conference in Chicago and now more than 300 CD-ROM titles have entered the market. A large number of the titles that have come out were never even thought of for online medium. Most of these CD-ROM titles are reference books and full-text databases. Most of the major bibliographic databases are available in this medium which includes MEDLINE, NTIS, LISA, COMPENDEX (to be released in January 1990), BIOSIS, MATHFILE, SCI, GEOREF and many more, Two directories are now continuously tracking CD-ROM databases entering the market[3,4].

Catalysing the CD-ROM publishing activity, CD-ROM mastering and production costs have declined dramatically from US$10,000 in 1986 to US$2,500 (1988 figures). The author's personal enquiry reveals that this cost has further come down today to US$1,500. The cost per disc for application has again come down from US$100 per disc three years ago to less than US$10 per disc today[5].

The turn around time in production and publishing too has come down with CD-ROM publishing activity going PC-based. Taking advantage of this, many of the databases which were updating quaterly have now started updating every month (MEDLINE, for example, is now updated every month matching its online counterpart). Indications are that some databases might be updated every fortnight.

Several published surveys are reflecting a very high rate of user acceptance. Libraries in the US are witnessing overcrowding and queueing at their CD-ROM workstaions. A recent OCLC survey reports continuing and more than expected growth rate[6]. Two unpublished surveys conducted at San Diego University Library and at Northern Illinois University libraries, related to the acceptance of optical discs for reference use concluded that 85 per cent of library users favour this new medium[7].

If the current trend continues, by 2000 AD, the author predicts, atleast there will be 5,000 CD-ROM titles in-print with each library having on an average 100 CD-ROM titles and 10 CD-ROM drives in US alone.

2. MULTIPLE DISCS AND DRIVES--RESOURCE OPTIMIZATION

More and more discs getting in to libraries will be prompting the need for more and more drives. Many bibliographic titles, because of their sheer size have to be put in multiple discs. Complete MEDLINE, for instance, comes in eight discs. This situation is already leading to not only logistic problems of managing multiple discs but also the increasing cost of having too many workstations and managing them. The question now is--how to provide access to a library of growing disc collection to a maximum number of users without correspondingly increasing drives and workstations?

The solution is not far to seek to address this problem from the already familiar networking and multi-user technology for computational resources. The innovation efforts started more than two years ago in this direction. At the annual convention of ALA held at New Orleans (August 1988) this author witnessed with excitement the first prototype model of CD-ROM drive working in a local area network (LAN) environment. Following is a review of the products and technology alternatives available for addressing the problem of access to multiple discs and drives.

3. CD-ROM WORKSTATIONS AND NETWORKING

A CD-ROM workstation consists of a microcomputer one or several CD-ROM drives connected (daisy-chained), and one or several CD-ROM databases mounted on several CD-ROM drives are made available in a juke box. Currently available CD-ROM workstations fall into five categories which are briefly described in the following paragraphs.

3.1 Single Drive Workstation

Most workstations existing today in the libraries fall into this category. These workstations can be either IBM PC-based or Apple-based, as drives are available today for any microcomputer configuration. The workstation can consist of either a stand-alone drive or a built-in drive (i.e., drive built into the microcopmuter like a hard disc). Built-in-drive is also popolary called as 'half-hight' drive. Hitachi's new half-hight drive model CDR-3600 is believed to be twice faster than Hitach's latest stand-alone model CDR-1503S. In a single drive workstation the CD-ROM title with multiple discs such as AGRICOLA will have to be manually changed which is quite an inconvenience.

3.2 Juke Box

The familiar concept of juke box used in music record players is adapted to CD environment. In this system one single drive can be supported by a juke box attachment which can automatically and quickly swap the disc. Several products have already come to market. The popular one is Pioneer which has a juke box type CD-ROM mini changer with six-disc magazine cartridge. The time taken for changing the disc in juke box system is typically in the order of five to fifteen seconds[8]. Another new product called Voyager released by Next Technology, UK, has specially developed juke box system for British Library which holds upto 270 discs and eight CD-ROM drives per unit.

The juke box attachment does not offer any significant advantage in a single user workstation as the disc can be always manually changed by the person present at the workstation. The advantage is visible when access to a single drive is provided in a LAN environment where the person searching will not be physically close to the drive for changing the drive and hence would require automatic changing facility.

3.3 Daisy-Chained Multiple Drive System

Daisy-chaining is a technique which enables interconnecting several drives which are in turn connected to and accessiblefrom a single microcomputer terminal. This will be convenient especially for CD-ROM titles which come in multiple discs.Unless one gets into LAN environment, Daisy-chained system may be cost-effective.

Daisy-chaining is achieved by cable connectors and built-in software interface. The popular drive models from Hitachi, Philips, Sony, Toshiba, NEC are all available in Daisy-chain models. Daisy-chaining interfaces and software can be separately bought by the drive suppliers.

3.4 LAN-Based Systems

With increasing user population for CD-ROM databases, connecting CD-ROM workstations to a LAN makes not only sense but also proves convenient and cost-effective. A LAN is a group of computers linked together by cables and special software that lets them share data. CD-ROMs can be accessed in a network using LAN, with generally fewer than 100 workstations. LANs optimize resource sharing. If the library has three databases, say, NTIS, COMPENDEX and Books-in-Print, each mounted on a drive and all the three drives Daisy-chained, this unit can reside in the library. Users in various departments can be connected to this unit through their PC and LAN link. This will make COMPENDEX available to the users online, at his disc with the database housed in the library. Figure 2 is a typical three-drive three-disc system networked in an eight-terminal LAN.

3.5 *Multi-User CD-ROM Systems*

The two distinct online advantages over CD-ROM are that (a) some databases could be accesses by several users almost simultaneously, and (b) Several databases could be selected for access from several remote terminals.

This facility was not available for CD-ROM storage systems largely because of inherent hardware limitation with CD-ROM drives in terms of access time and transfer rates for the data. However, the breakthrough has been achieved to make it possible to connect the CD-ROM drive with a disc to work in a multi-user environment. This author had the opportunity of working with a few multi-user systems at the recent CD-ROM Expo 89 in Washington. The response time in a situation where three people who are simultaneously accessing is relatively as good as the response time in an online system like DIALOG. The response time will substantially suffer if more than four people try to access the same database simultaneously. But the improvement in technology will overcome this situation too. Multi-user system appears to offer an excellent opportunity and alternative for creating localised online access facility for CD-ROM databases[9].

4. PRODUCTS IN THE MARKET

The following four companies have currently introduced network-based CD-ROM system/products.

* CD-NET by Meridian Data, Inc, USA,
* OPTI-NET by Online Computer System, USA,
* MULTIDOS by Annex Technology, Inc., USA, and
* CD-Server by CBSI, Inc., USA.

4.1 *CD-NET BY Meridian*

CD-NET makes it possible to share the CD-ROM databases to access in a multi-user environment by integrating CD-ROM drives into any standard LAN. CD-NET can be configured for TOKEN RING, ETHERNET, and ARCNET, and supports Novell Network Software. In its mini configuration, CD-NET features five half-hieght CD-ROM drives, a network board with an 80286 or 80386 microprocessor, integration/operation software, and a power supply, all cobined into one cabinet. Each CD-NET can be expanded to 11 drives with the expansion chassis. CD-NET Model 200T can support 30 workstations in a heavy intensive user environment and 80 workstations in moderate environment. CD-NET supports any CD-ROM drive. However, Meridian uses Hitachi or NEC drives which are known to be easily available in the market. Figure 2 shows CD-Net in a LAN environment.

4.2 *OPTI-NET*

OPTI-NET is a perfect solution for adding more CD-ROM applications into an existing network as long as the network fully supports NET-BIOS. OPTI-NET software allows access for upto 32 CD-ROM drives of any configuration. OPTI-NET makes available either the software or the fully dedicated turnkey system.

4.3 *MULTIDOS*

MULTIDOS is a very low cost operating software for CD-ROM networking. The software supports upto eight terminals. Annex Technology, Inc. offers only the software and the user has option to buy his own hardware, drives and LAN software.

4.4 *CD-Server by CBIS*

CBIS offers a CD-ROM networking solution consisting of a fast, multi-user CD-Server tower coupled with CD-Connection software. The CD-Server is a tower capable of accommodating upto 14 CD-ROM reader drives with the ability to add up 16 MBof additional memory for caching. CD-Connection allows a total of 254 users on the network to access multiple CD-ROM drives simultaneously and requires only a 2 KB workstation RAM overhead, and MSCDEX need only reside on the server. It supports over 25 topologies and is compatible with Network-OS, Novell Network Software, and other LANs. CBIS is a recently introduced product and is considered as efficient as Meridian's CD-NET.

5. MULTIPLATTER FROM SILVER PLATTER

Silver Platter recognised the need for networking by their market surveys and again were the earliest to start on this project. They first tried with OPTI-NET and developed a prototype model. Later they used Meridian's technology for perfecting their MULTIPLATTER system. Today MULTIPLATTER is installed in quite a few libraries in the

US. It is a complete system that comes with

- * Networking software,
- * Interface cards,
- * CD-ROM servers,
- * CD-ROM drives, and
- * Silver Platter Network Manager software.

MULTIPLATTER can be used for not only Silver Platter's databases but also the databases of others produced according to the High Sierra standards.

6. COST AND CONNECTIVITY COMPARISON

Since most of these products are new in the market, notmuch data is available for comparison. CD-NET has a wide installation base of more than 100 installations in USA only. The costs for a minimum configuration of a five-drive system, CD-Server and software is ranging between US$5,000 to 8,000. Except MULTIDOS, all other systems are available as turnkey systems with drives, and the associated basic hardware and software.

7. NETWORK LICENCE FOR CD-ROM DATABASES

A multi-user CD-ROM system in effect offers the advantages of online systems allowing several users to share the facility. This raises the question of licensing fee for multiple site usage similar to the database usage royalty which will be paid to the online database producers by online hosts like DIALOG. Fortunately, many of the CD-ROM databases are available on CD-ROM without any additional royalty or licensing fee. For instance, Silver Platter does not charge licence fee for most of its databases such as MEDLINE, NTIS, etc. OCLC has not decided the issue as yet. There is a separate licence fee for many CD-ROM databases to use them in a network environment. This issue is more decided by the database owner than the database producer and it is likely to continue as a debatable issue.

CONCLUSION

The products appearing in the market being new, in the coming years we can see several surveys regarding cost and benefit comparisons of various systems, and other user- and system-connected issues. In the early year of its introduction, CD-ROM did create a psychological fear of adverse competition in the market of online databases. However, this fear was found to be untrue as the online industry has continued to grow at a healthy rate of more than 15 per cent annually. The question now is, will the emerging multi-user CD-ROM systems pose threat to the traditional online systems like DIALOG? If the viability in terms of the cost per user is criterion, the network-based CD-ROM systems are likely to remain in-house systems. For efficient multi-user access, a CD-ROM-based system still suffers from major hardware disadvantage of drive speed. CD-ROM access time is nearly completely a function of a disc rotating motor. Changing the disc takes quite a bit of time. The only way is to make the rotating motor more powerful. This could be possible as motor technology is always advancing. When a breakthrough occurs in advancing motor speed, it is possible to visualise a scenario of online hosts like DIALOG replacing their magnetic discs with CD-ROM or any other efficient member of optical disc family. Even now it is possible to connect a network of CD-ROM databases to wide area network for remote access typically in the fashion of online systems like DIALOG. When such a situation happens, we can duplicate a system like DIALOG in India at a very low cost, hoping that we will have better communication network by that time.

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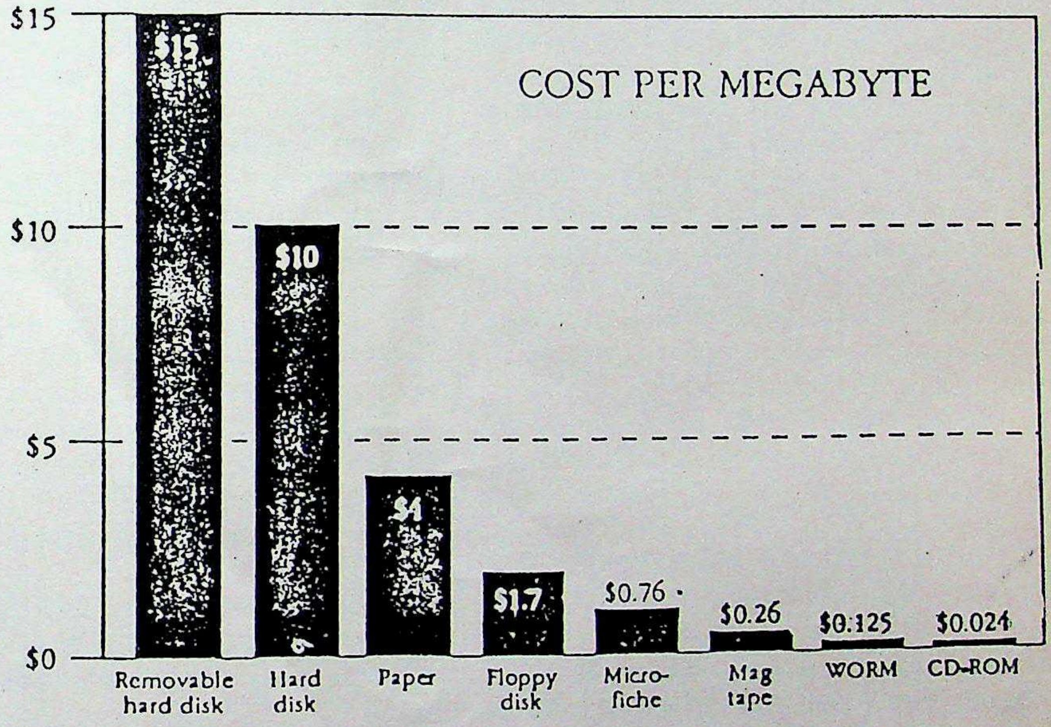
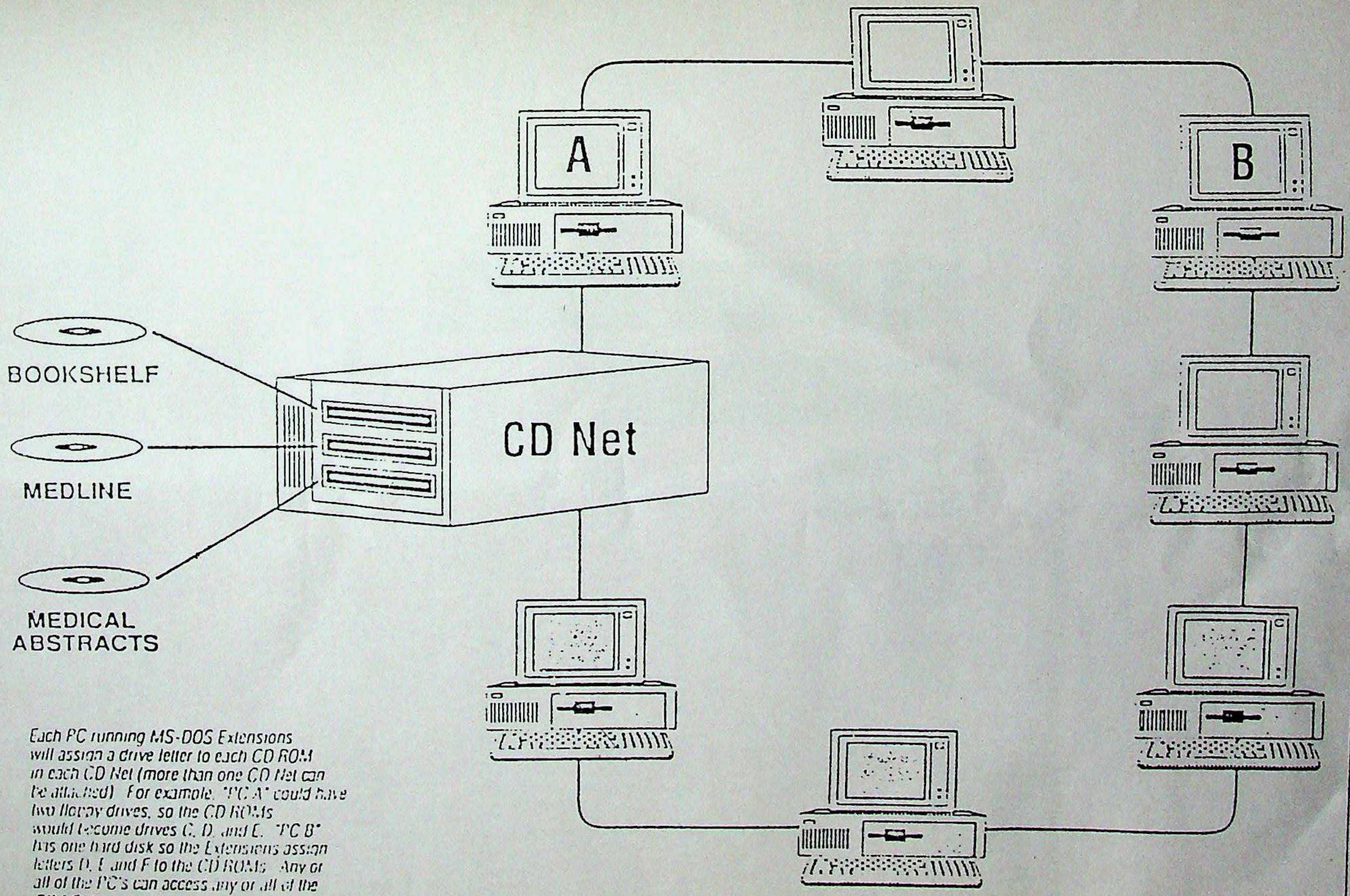


Fig. 1. Comparison of costs of different storage media.



Each PC running MS-DOS Extensions will assign a drive letter to each CD ROM in each CD Net (more than one CD Net can be attached) For example, "PC A" could have two floppy drives, so the CD ROMs would become drives C, D, and E. "PC B" has one hard disk so the Extensions assign letters D, E and F to the CD ROMs Any or all of the PC's can access any or all of the CD ROM's.

Note: With more than one CD Net, the Extensions would simply assign more drive letters

Fig. 2. CD-NET in a LAN environment.

TECHNICAL PROCESSING IN LIBRARIES: LIMITATIONS AND PROSPECTS

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1. INTRODUCTION

Libraries are repositories of collection of documents and kindered materials. They essentially aim to provide access to collections and specific items in a collection. This calls for a systematic organisation of collections and specific items in a collection. Organisation of documents calls for the twin traditional skills of classification and cataloguing.

The purpose of classification is to assign a call number to each document acquired into the library and help arrangement of documents in the shelf. Such an arrangement should be browsable by intellectuals, scholars and the casual reader. It should be simple enough to be arranged by people of not much education. Whetherwe like it or not, books on the shelf have to be arranged on the basis of the call numbers. Therefore, classification is here-to-stay.

Cataloguing is another ancient working skill of librarians. It provides access to surrogates or representation of documents. This is primarily to provide multiple access to a variety of users' approach to the documents. It is an aid to collection analysis, content analysis and linking users to documents and documents to the user.

Thus, we find the twin techniques and tools of classification and cataloguing are the primary aspects of technical processing in libraries.

2. ORGANISATION, VARIETY AND SPECIFICITY

Organisation of a collection is the problem of the technical processing in libraries. The library usually gets a variety of readers. Each reader is a typical sample by himself. The information seeking behaviour exhibits its own individuating pecularities. So also each document is unique in its structure of knowledge, exposition and the physical encasement of the same. How do we meet the plethora of varieties? How to organise them for better access is the librarians' problem. From time immemorial, when users were few, so also the documents were few, the problem was simple. These were managed by the comprehension of individual memories. The location of documents was in the memory of an individual and it was easy to locate on demand. The ways in which the libraries organised their collections once they went beyond the reach of individual human memory was to adopt a scheme for classification and code for cataloguing. Last century people usually developed individual codes and schemes. Sometimes large libraries provided the same for smaller libraries. Then began a kind of standardisation. The intellectual systematisation began to emerge--the Dewey Decimal Classification, Colon Classification and Rider's International Classification. Eight major classifications and more than a thousand special classification schemes and nearly five thousand thesauri and vocabulary control devices have emerged. So far there are as many codes as there are libraries, but there are some major codes beginning from Pannizi's rules of British Museum Libraries to RDC by Cutter and Subject Headings of Library of Congress, Anglo-American Code, Persian Codes, Classified Catalogue Codes, AACR, ISBD, etc. There is a growing convergence on the practices to be followed in libraries.

3. FUNCTIONAL ASPECTS OF TECHNICAL PROCESSING

Many of the Indian Libraries have been organised on the basis of one of the three schemes for classification, namely, Dewey Decimal Classification, Universal Decimal Classification and Colon Classification. Large number of libraries have adopted Dewey Decimal Classification. As far as cataloguing is concerned the three codes ALA, AACR2 and Classified Catalogue Code of Ranganathan have been adopted.

The basic problem with classification schemes are that they should be kept upto-date, so that the problems of classification of new books or new subjects in books are accommodated. The general schemes for classification, are lagging in subject representation to the extent needed by the libraries. There has been compatibility problems for coextensive representation of subject. The rate of growth of new subjects, as well as structural challenges to already known subjects, calls for classification and reclassification. The improvisations of the general schemes for classification by classifiers acting as classificationists-in-little, has been going on far too long and deviations with the orginal has become an acceptable norm.

As for cataloguing is concerned, newer sources of physical forms such as floppy discs, CD-ROMs and other magnetic recording media are calling for special purpose cataloguing. The newer codes and standards at national and international level are providing a variety of guides for non-print material. The Common Communication Format (CCF) also provides scope for descriptive cataloguing of these documents.

4. PROBLEMS IN FLOW OF DOCUMENTS

The other types of problems refer to the flow of documents acquired through various methods. In particular, the flow of documents into the technical processing services are not in module, but in a rush. Say it may be due to purchases at the end of the financial year or it may be due to booksellers sporadic and incomplete supply of documents. Therefore, the manpower deployment for technical processing creates problems of all sorts. The performance of the staff in relation to each document's processing gets affected, normal standards cannot be applied.

The deficiency due to unequal flow of documents has been the bane of the technical processing department in all the libraries in India. The university and college libraries, and public libraries suffer badly on account of these. Special libraries do not have any question of being affected, as they are continually pestered for that, because of uncertain and sudden demands.

On account of the backlogs in the technical processing in libraries and many times, the urgency for passing them to intended users, library staff have either postponed or abandoned classifying and cataloguing of documents. This leads to incompleteness in the technical processing. The card filing, subject-wise orauthorwise, gets into problem. We also find arranging the unclassified and semi-classified books a difficult problem.

5. SOLUTION FOR SOME OF THESE PROBLEMS

The acquisition of documents should be appropriately spaced throughout the year. As soon as a document is acquired its classification and cataloguing should be done immediately without giving too much attention to perfection. Delay here would affect every department of a library.

Modifying a general scheme for classification for a library's need is a common phenomenon. Waiting for editions of authorised modification leads to a lot of time-lag and other problems. The modification should, of course, be written in the form of a code of practice for classifying and cataloguing in libraries. It is better to have consultation and coordination among reference and maintenance staff.

Another suggestion refers to education of the professionals. Good background in structural and developmental aspects of subjects, understanding the interaction among specialists, analysis and intimate knowledge of the types of institutional and commercial publications flow in the field. Then, comes the skills in practical classification, that is, assigning class numbers according to a scheme for classification and practical cataloguing by adopting a code for the purpose. The technical processing staff should also have opportunities for continuing education.

There should be periodical interchange of staff in technical section and sometimes they should also discuss with the readers. These are some lines of the suggestion. This seminar may discuss some issues in detail and give more suggestions.

STUDIES ON USE OF LIBRARY COLLECTIONS BY SCIENTISTS, ENGINEERS AND TECHNICIANS

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ABSTRACT

This paper stresses the need for user-research and use studies at the individual library level; defines related terms and concepts like user, use, need, want, demand and requirement; reviews some important studies on use of library collections and interaction of scientists, engineers and technicians with libraries. It enumurates the relationships found in past studies between characteristics of scientists, engineers and technicians and their use of library collections as well as their interactions with library. Finally, lack of sound use studies based on critical incident data in the country is pointed out.

1. INTRODUCTION

The user is the key person in any information system. All the luxuries of information revolution and problems of information explosion are centred round the user and his convenience. Understanding the user is half the battle in providing information services. The success of any information system depends considerably on how best the system design is based on a close and accurate understanding of the users. The effectiveness of library and information system depends on the extent to which the system characteristics correspond with the user and on how much the potential user is willing and able to make use of it. System designers, planners and managers have, by and large, failed to properly consider the role of human factors and their effect on acceptance and utilisation of information (Mick, 1980, p. 21). Landau and others (1975, p. 422) say '... in a great majority of cases, the user is neither understood nor studied, nor in some cases even identified until after the system is already evolved or in a completely operational state. Some have characterized this as an upside-down system design'. Brittain (1975, p. 429) says a lip service has been paid to this objective in many studies.

'Know thy customer' isthe cardinal rule of any business enterprise. Accordingly, extensive market research, customer behaviour studies and demand forecasting are carried out in business. A formal information centre or library is yet to pick up these activities in the same spirit. It may be partly due to not-for-profit and paternalistic nature of libraries.

There appears to be a lopsided emphasis in library and information field on user education than on understanding the user. This is largely due to the systems designed and implemented, which are unfriendly, complex and not concerned with the perceived needs of users. What is more important is intensive librarian education about users than mere education of users of the existing system (Thompson, 1982, p. 11). Hoadley and Clark (1972, p. 133) say that a library can achieve its goal '... if the library is more precise about who its users are. This precision, coupled with more research into behaviour and information gathering patterns of these user groups, will assist the library more effectively in developing programmes and using its resources and limited funds to achieve desired goals'. Accurate and upto-date knowledge about users and their information behaviour is one of the essential ingredients for designing an information system. The need is for user-driven design than technology-driven design and more research on human variables of information system than technology and system variables (Atherton, 1975, p. 672). Unfortunately, the emphasis in the profession has been on imparting technical skills than information skills.

Eventhough considerable research has been done in the area of user- and use-studies in developed and information rich countries, especially USA, Britain, and European countries, practically nothing substantial is done in less developed countries in general and India in particular. Not even a single major user- and use-study in any of the areas of science and technology has been done in the country. Even the major national information system designs were not preceded by systematic, reliable and comprehensive user-studies. As such many present systems are surviving under 'symmetry of ignorance' (Kunz,*et al.*, 1977, p. 67, - 68), mathematical induction of convenient good or bad things, subjective considerations and idiosyncracies of people involved in planning information systems. Other systems are thriving under dubious reasons of avoiding the duplication of research and resultant economic benefit arising out of information systems but the hidden apparent reasons of an information system, as Myers (1970, p. 26) says, could be treating information system as a prestige centre or a form of fringe benefit to employees or a paid up insurance to serve an unanticipated need or to sublimate the feeling that one does not read or a centralised way of budgetary control over expenditure on documents.

2 THEORETICAL BACKGROUND AND RELATED TERMS AND CONCEPTS

In the process of seeking information, what mainly takes place is an effort to match a cognitive need of user with a source of information and seeking supply of information to satisfy the need. This process naturally involves many phases and factors. First, the need could be unclear and uncertain. Secondly, user could be biased, subjective, conservative, habituated and having his own styles and idiosyncrasies. Further, apathy towards a new service or system is not unusual and in one case researchers were reluctant towards new services (eventhough they desired) and did not even directly examine the service attributing it to lack of time (Trueswell,*et al.*, 1965; Van- cott and Kincade, 1967).

The individual's initiative plays an important role to recognise a need for information, to seek and search information and to use it irrespective of availability of services (Wilkin, 1981, p. 4.30). However, this does not underestimate the importance of availability of information facility/service for one to seek and use. Infact, availability or existence of needed information is one of the necessary conditions, next only to the need and the initiative to use. Then comes the sufficient conditions that the available facility/service should not only be accessible to the user but also easy to use. Above all, the user should perceive that the source or facility is useful for the need concerned. The perceived utility of a source is based on both the quantity and quality of information expected from it. Ignorance about a piece of useful information either due to the apathy of the user or due to the failures of information system when realised leads to alter the composition of monitor, reserve and supply of information in a cost-efficient way to yield a relatively satisfactory information supply provided the ignorance is neither too small to worry about nor too large to be remediable (Wilson, 1977, p. 74). In the process of adaptation of altered system the cost in terms of time and efforts is optimised and sources that adapt to needs of user are preferred to sources which require the user to adapt himself. In other words, personal information gathering is often purposive, adaptive, habitual and economical (Wilson, 1977, p. 80). The lack of awareness on the part of the user about existing information systems could also be a factor for its non-use in addition to convenience, responsiveness and ability to conduct dialogue with the system (Ackoff, *et al.,* 1976, p. 143).

Atherton (1977, p. 7) summarises these factors involved in seeking and using information in the following words. "The working habits of the individual needing information, the importance placed on getting it, the facilities available for seeking it, the knowledge about the facilities, the judgement of their value, the estimate of the probability of getting what is wanted--all of these factors may affect information seeking behaviour. Unless a person who wants information is fairly sure of getting it without much trouble, he is apt to do without it, if it is not essential. Relying on memory, skirting around the issue or making do with incomplete or vague information from a colleague are not unusual behaviour traits. There is, however, a small group of users who actively seek information spending effort and resources to acquire pertinent information and these users in fact are the most progressive in economic activity'. Scientists and engineers are more likely to invest or reinvest efforts and resources for reinventing than to derive it from the research or development work of someone else, especially someone they don't know, in a different organisation and in a different discipline (Havelock *et al.*, pp. 8-16). They may even estimate that generation of new knowledge will be cheaper than an expensive and possibly fruitless search (Paisley, 1968, pp. 19, 20).

The complex trio concepts, viz., accessibility, 'ease of use' and perceived utility of a channel are extensively investigated by Allen and

Gerstberger (1967, 1968). The concept 'ease of use'* which is akin to 'law of least efforts', Mooer's law and 'why bother theory of information usage' (Cooper,1978) appears to be the supreme criterion in use of a source of information (Rosenberg, 1966, p. 19). Moor (1972) has developed a model incorporating seven dimensions as measurable components of the concept ease of use of an information system. The dimensions are--movement required (out of the user's personal work area), time delay, interaction, interface structure, required location of use, permanence (nature of information provided) and response filter. The model was empirically tested from the data from R&D personnel and concluded that these dimensions do serve as a model for identifying behaviour.

A use study has to necessarily keep a set of defined population of users in the background. It is also necessary to understand other related concepts and terms like need, want, demand and requirement before commencement of any use study.

'Need' is a more abstract and difficult-to-define concept. Both Ford (1980) and Krikelas (1983, p.6) define 'information need' as an awareness or recognition of not knowing or existence of uncertainty. The draft definitions of 'need', 'want', 'demand', 'use' and 'requirement' in relation to information proposed by Brittain (1971) and supported by Line (1974, p. 87) are quite adequate for the purpose. 'Need' is what an individual ought to have, for his work, his research, his education, his recreation, etc. A need may or may not be identified as want.

The interesting and most practical aspect is that 'needs arise out of the roles an individual fills in social life. So far as specialised information system is concerned, the most relevant of these roles is 'work role', that is, the set of activities, responsibilities, etc, of an individual usually in some organisational setting in pursuit of earnings and other satisfactions' (Wilson, 1981, p.9).

'Want' is what an individual would like to have, whether or not the want is actually translated into a demand on the library. Individuals may need an item they do not want, or want an item they do not need. A want, like a need, is a potential demand.

'Demand' is what an individual asks for; more precisely, a request for an item of information which is believed to be wanted. Individuals may demand information they do not need, and certainly need or want information they do not demand. Demand is partly dependent on expectation, which in turn depends partly on existing provision of library or information service. A demand is a potential use.

'Use' is what an individual actually uses. A use may be a satisfied demand, or it may be the result of browsing or a chance. Individuals can only use what is available. Use is, therefore, heavily dependent on provision and availability of library and information service. A use usually represents a need of some kind. But need is independent of use. Uses can be partial indicators of demands, demands of wants, and wants of need. Identification becomes progressively more difficult from the 'hard' use to the often nebulous and unstated need.

The term 'user' includes actual as well as potential users and even non-users. The concept of 'use' is often defined as the extraction of content from a message to meet a need. The operational definition of 'use' for collecting data about the use of the library documents could be stated as physical selection and the act of leafing through pages of document as far as in-house use is concerned (Kent *et al.,* 1979, p. 61) and for circulation or loaned use, each record of having lentout or renewed is considered as one externally circulated use of a document.

'Requirement' is a useful bridging term; it can mean what is needed, what is wanted, or what is demanded, and can therefore be usefully employed to cover all three categories. But the term requirement is closer to the term need. Many studies of needs have infact been studies of requirements.

3. STUDIES ON THE USE OF LIBRARY COLLECTIONS AND USER INTERACTIONS WITH LIBRARY

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* Users will utilise an information service only when doing so costs them less than not using it (Mooers, 1960, p. (ii)).

There have been many use-studies of library collections and a majority have analysed what is used, frequency of use, lifetime and obsolescence rate of material used, etc., with varied objectives. They were also thought of as demand studies. Studies of user interactions with libraries did not receive enough attention in the past. Many indirect studies like bibliometric and citation studies have also attempted to study and determine the use of library collections by scientists, engineers and technicians, but owing to their in-built limitations and non-local scope, their utility and even reliability are limited. The critical incident data of specific demands made on typical libraries should reveal behavioural trends, and indicate their underlying motivation better than a theoretical and qualitative investigation (Slater and Fisher, 1969, p. 1).

At the outset, it should be made clear that the use of a document or library does not imply its utility or usefulness. Nor does a high or intensive user interaction with the library necessarily imply that the user is an intensive user of the library or a highly library dependent user. 'An information system may be used, then, but not be useful; it may also be useful, but not used. It may even be neither useful nor used. It is ideal if it is both used and useful' (Kochen, 1976, p. 150).

Depending on the intensity of use, the users are classified as 'high information-potential' (HIP) and 'low information-potential' (LIP). LIPs are further divided into (i) the nostalgic, who would like to keep informed but never have time, (ii) the bereaved, who think it is now too late to update themselves, and (iii) the lost souls, the confirmed non-users (Shuchman, 1981, p. 1). Secondly, the number of users who have need of information far exceed those who actually use information (Atherton, 1977, p. 7). At the same time, it should also be noted that the services of libraries are not restricted to, those actually use them but reach others via actual users due to 'spillover effect' (Wilson, 1977, p. 83). As a matter of fact the lost souls (among engineers) might be heavy users of information in different forms (Shuchman, 1981, p. 23). Thirdly, the '... concern with users should not be equated with an objective of maximising use (sales)' (Oldman, 1976, p. 37). Lastly, it is not yet established that the use of libraries has any definite influence on anything else (Ford, 1977, p. 101).

4. USE OF LIBRARY COLLECTIONS

One of the ways of exploring use- and user-studies isto study the actual incidents of use of information and documents. By and large, the use of library collection is a 'minority event', i.e., a very small segment of rightful members really use collection of their 'primary library'. Like insurance, for a majority of the users the library appears to be a necessary adjunct to the regular work without much direct consequence attributable to the existence of the library. However, its absence is normally felt by some marginal users too. The studies of Shuchman, Scott, Gilmore and others, Slater and Fisher and that of 'The Social Survey' have very much shown this aspect. For example, The Social Survey, in its survey of UK electrical industrialists found that in the case of those firms which had a library, less than half of them used it and 18 per cent of the respondents said that they did not use libraries of any kind (Scott, 1960, p. 36). Similarly, in the case of Slater and Fisher's survey (1969, p. 21) the ratio of potential users of library to total membership was 26.3 per cent industrial firms and 22.6 per cent for government establishments. Surprisingly the same was as high as 69 per cent in an Indian study (Sridhar, 1985, p. 31 32). A study of Science Library at MIT (Bush, *et al.* 1956, p. 94) showed that the ratio of visits to enrolment as 0.37 and Shuchman (1981, p. 30) found technical libraries serving only a small proportion of the engineers. When the use of library documents is examined, we find that still smaller segment of users use library documents typically following the 80/20 rule.

Just as inter-personal communication follows the inverse square law, the amount of use of a library is also inversely related to the square of the distance between the library and the functional group to which a user belongs (Frohman, 1969). Yet the psychological distance may be more important than physical distance (Line, 1974, p. 48).

Among all types of documents, 'use of journals' has been studied by many with different methodologies. It was found in these studies that a major portion of the reading of the scientists, engineers and technologists is in journals (Shaw, 1971, pp. 23, 24, 32-35, 81 and 82). In journal reading behaviour, 'issues' like how many journal a user regularly reads, how much time he spends on journal reading, the place of reading journals and the factors which affect journal reading have also been investigated. Though the findings are almost unanimous that a user can cope up with his field by reading few journals, the average number of journals actually read varied widely. In Menzel's study (Columbia University, 1958, p. 135), three most important journals accounted for 0.49 fraction of articles read by research scientists. Two surveys of Case Institute of Technology (1960, p. 12) showed that ten mostly-read journals accounted for 55.1 per cent and 49.8 per cent of the chemists' journal reading time respectively. Many studies have confirmed that an average scientist/engineer/technologist reads 5 to 15 journals while normally a scientist reads more journals than an engineer or a technologist (Scott, 1959, p. 113; Martyn, 1964, p. 20; Bernal, 1948; Martin, 1962, p. 98; Wood and Hamilton, 1967; Graleswka-Vickery, 1976, p. 274; Hanson, 1964, p. 65; Ford, 1977, p. 32). The use of books and other documents of library have very widely varied from library to library, from subject to subject, and no generalised conclusion except 80/20 rule cited above can be made as far as user behaviour is concerned.

5. CORRELATION OF USE OF LIBRARY COLLECTIONS WITH USER CHARACTERISTICS

The correlation of use of library documents with user characteristics has not always shownconsistent results. Interestingly, a person who saw more journals tended to be active in many ways like attending more meetings and conferences, actively engaged in the work and having better qualifications (Scott, 1959, p. 28).

First of all, the use of library documents is found to vary with the type of organisation and users. Those employed in government establishments and industries have made relatively less use of library (and journals) than those employed in academic and non-profit organisations (Slater and Fisher, 1969, p. 15; Meadows and O'Connor, 1969). The analysis of use of library in science subjects versus engineering/technology is found to be fairly close to that of scientist versus engineer/technologists pattern, i.e., scientists particularly those in research made more use of libraries than engineers and others (Case Institute of Technology, 1960, p. 21). Surprisingly, the average number of documents consulted by scientists (3.9) was lower than that of engineers, but the ratio of used to useful documents was more favourable for scientists. The pressure of time bothered engineers slightly more than it did scientists, but slightly less than it did non-technical personnel. Technicians were found to be underprivileged group in the information complex (Slater and Fisher, 1969, p. 17, 18 and 50).

The use of library documents (and journals) was found to be linearly and positively related to the age and experience of users as per studies of Scott (1966, p. 28), Lipetz (1970), Fearn and Melton (1969). However, beyond the age of 45 years and 10 years of experience the use was found to decline. But the opposite (i.e., negative relation) was found in studies like that of Bath University Library (1971), Barkey, (1966) and Ford (1977, p. 93). Women space technologists did not differ from men in making borrowed use of library documents but differed significantly in in-house use and interactions with the library (Sridhar, 1987). Again the use of the library was found to be positively related to the level of education of the users (Scott, 1966, p. 16; Lipetz, 1970; Fearn and Melton, 1969).

Creativity, performance, excellence in work and publication activities are also found to be positively related to use of libraries (Lufkin and Miller, 1966, p. 180; Case Institute of Technology, 1960, p. 21). However, a recent study found no strong relationbetweenthe use of libraries and academicperformanceof users (Hiscock, 1986). In addition, high status scientists and engineers tended to use more of library materials and subscribe to more journals (Shaw, 1971, pp. 17-20, and 48, 49) and managers and supervisors, particularly those in research and production areas, tended to read more journals than others (Scott, 1960, p. 28).

6. USER INTERACTIONS WITH LIBRARY

Like 'use of library', user interactions with the library is also a phenomenon of a minority of users. In fact, both the use of library and the user interactions with the library are highly interdependent and related. However, there is not much research work done about user interactions with the library. What is available in literature are fragmentary stray attempts to study some interactions of users with libraries. This may be partly due to the time-consuming observation technique to be followed for the purpose. For the same reason many use-studies also did not venture to consider the in-house use of library documents.

A user visits the library for many purposes. Interestingly, Slater and Fisher (1969, p. 29) found that 38 per cent of their respondents visited their libraries for work space (11 per cent exclusively for work space). Even in the study of Science Library at MIT (Bush, *et al.,* 1956, p. 88) a considerable number of persons used the library only as a study hall to make use of their own material. On the contrary, Scott (1959, p. 113) found that 59 per cent of the respondents claimed to do most of their journal reading at home followed by 27 per cent at place of work, 2 per cent during journey on train, 3 per cent in a library, 1 per centin other places and 2 per cent of the respondents did no reading of technical journals. In a study of in-house use of library documents and seat occupancy, the space technologists were found to visit the library more during departmental reviews for promotion. The distribution of user-visit data over a typical day was bimodal, roughly symmetric and the same was cyclical over a typical week with maximum during the mid of a working week (Sridhar, 1982). Like use of library documents, the reservations made by the space technologists for lentout documents followed skewed distribution and year of acquisition of a document had a stronger effect on its chances of getting more reservations than year of publication (Sridhar, 1983). In another study, it was found that less than one-fourth of the space technologists nave had participated in collection development of the library (Sridhar, 1983). Yet another case study showed non-use of classified catalogue, heavy use of subject catalogue and a roughly symmetric bimodal distribution of card catalogue consultation over a typical day by the space technologists. Further, card catalogues are consulted most of the time either to locate a document on the shelf or to interact with the circulation counter than for literature search (Sridhar, 1986). A rational summary of enormous data of use of the library collection and interactions with the library by Indian space technologists is done by way of developing suitable indexes of library use and user interactions with library (Sridhar, 1988).

There are no comparable results of earlier research about specific aspects of user behaviour within library as far as scientists, engineers and technicians are concerned. Most of the findings of user movement/traffic, consultation of card catalogue, in-house use, length of stay, seat occupancy, etc., are that of academic or public library users. Apart from science library at MIT mentioned above, Pings and Anderson's (1965) study of user movement/flow pattern, the study made by the University of Cambridge Library Management Research Unit (1975) about seat occupancy, and Campbell and Shlechter's (1979) study of library design influences on user behaviour are some of the studies in this direction.

7. CONCLUSION

It was not the intention of this paper to examine studies of use of library collections by scientists, engineers and technicians from the angle of (i) collection development and evaluation with the purposes of identifying highly used to add additional copies, less used to relegate to remote/compact storage and unused for discarding, (ii) promoting better usage of less used and unused, (iii) examining the broad generalisations such as (a) books which are unused during an initial period are more likely to remain unused and those heavily used continue to be used later, and (b) use data of a library collection follows reverse J-shaped curve or 80/20 rule, and (iv) determining life time and obsolescence rate of library materials, relative use in different subjects, etc. The purpose here is to look at the use-studies from the angle of information use pattern of scientists, engineers and technicians. As such many studies like that of University of Pittsburgh (Kent, *et al.,* 1979) are not cited here.

Like bibliometric and citation studies, use-studies also have some limitations. If use-study is not properly designed with adequate reliability and validity, results can cause serious distortions and lead to disastrous decisions.

The research on use of library collections by scientists, engineers and technicians has fairly helped in better understanding of their patterns of information use though there are some inconsistencies and contradictions. The review of use-and user-studies clearly indicated the void in nature of user-research in the country. User-studies have been neglected both at local and national level by planners of S&T information systems. The piecemeal studies have been mostly local studies of a particular aspect of user behaviour or indirect use-studies or studies based on weak methodology and data. The majority of even the piecemeal studies are done by academicians and students. Unless sufficient baseline studies are done within the country by the information personnel 'living with the tribe', further developments cannot be carried out based only on the findings of studies done in USA or UK.

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COLLECTION DEVELOPMENT IN LIBRARIES AND INFORMATION CENTRES

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1. THE IMPORTANCE OF LIBRARY COLLECTIONS

The basic test of the quality of any library or information centre is how good its document collection is and whether it is strong, relevant and balanced. "Good scholars need good libraries and good libraries attract good scholars[1]." This interaction arises mainly from good document collections.

To be effective, a library must provide books and other kinds of communication media that are appropriate to the needs of its users. The principle of appropriateness implies that selection of books and other materials shall be deliberate and discerning and that it shall be planned in accordance with well-defined policies and procedures. The amount of satisfaction a reader gets in a library depends directly upon the kinds of books the librarian has made available for the users. Accoriding to Pafford[2], of all the responsibilities of a librarian, collection development is the greatest, to see that as far as resources allow, the right books and periodicals are being added to the library. Dr.S.R.Ranganathan had also laid considerable stress on a library providing books to meet the "current and foreseeable" needs of the clientele. The "Sumum bonum" of libraries, in his opinion, is collection development, since all other services of a library flow from the collections3.

The art of acquiring and building good collections is among the oldest characteristics of librarianship. Some of the best known figures in the history of librarianship were collection developers. Unfortunately, in many libraries in our country, collection development is not given the care and attention it deserves and is treated as something in the nature of a library routine. In many cases, administrative and clerical staff are allowed to work in the acquisition section of a library. In our opinion, the richness and strength of document collection in a library reflect the professionalism, vision, ambition, knowledge and dedication of the librarian-in-charge and his colleagues in the acquisition section.

2 NEED FOR A COLLECTION DEVELOPMENT POLICY

For the sake of continuity, consistency and effectiveness, it is desirable, even necessary, to formulate a broad collection development policy duly approved by the competent authorities to serve as a guide for the librarian and his staff involved in building up document collections. The policy should be planned with great care and put down in great detail to avoid any ambiguity and confusion. This policy statement is to be followed until it is proved to be wrong and ineffective and a new policy is approved in its place.

The broad collection development policy should be followed by the criteria for:

* Book (and other documents)selection;

* A statement of limiting factors governing purchase of the documents; and

* A listing of techniques and selection tools.

The collection development policy must be framed by the librarian-in-charge who might consult, if necessary, the library committee and any other advisory body. He should also consult members of his staff and colleagues in other libraries who have experience in collection development. The policy so framed must be in conformity with the administrative and financial procedures of the parent organisation relating to the delegation of powers for document selection, issue of purchase orders, certification of bills, budget control, and so on.

3. OUTLINES OF A COLLECTION DEVELOPMENT POLICY

A collection development policy should outline several basic features[4] as under:-

3.1 Authority for Determining the Policy

The authority for determining the policy in the selection and acquisition of materials should be determined, i.e., whether the authority rests with the head of the organization or the library committee or the librarian.

3.2 Responsibility for Book Selection

The responsibility for selection may devolve on

- The users entirely
- The users with the aid of the librarian and his staff, and
- The librarian entirely.

The reliance on the users entirely in book selection arises from the assumption that only the users can identify those materials most appropriate for their study and research. However, this assumption may not be correct always. The actual needs and usage of the documents may be different from those perceived by the selectors. Users may be overburdened with other work and may have little time to involve themselves in the selection process. They may lack acquaintance with the publishing trade. Some may select only in their own narrow area of specialization. Some others just may not care about book selection.

In view of these reasons and for the sake of continuity as well as professional responsibility, librarians should insist on selection responsibility in any policy document.

3.3 Objective of the Policy

The objective of any collection development policy is to obtain expertly-selected books to further the library's goal of providing information and reference.

3.4 Criteria for Book Selection

The collection development policy should lay down the creteria governing book selection. Some of the important criteria to be considered[5] are:

* Permanent or timely value,

* Accuracy,

* Authoritativeness,

* Comprehensiveness,

* Clear presentation and readability,

* Usefulness to any particular group,

* Importance of the subject matter to the collection,

* Scarcity of material on the subject,

* Coverage in special bibliographies or indexes,

* Language,

* Availability of the material in other libraries in the area,

* Reputation of the author and/or the publisher,

* Format--paper, printing, binding, etc., and

* Price.

4. PRINCIPLES OF BOOK SELECTION

The collection development policy should also enumerate the principles of book selection for the guidance of those charged with the responsibility for the selection.

Some of the essential principles[6] to be highlighted are :

* The selection shall be based on purpose and need.

*The high-point in book selection is choosing the right document for the actual and potential users on demand and in anticipation. Demand is the most important governing factor in selection.

* The needs of the user community are to be ascertained; the needs of the entire community are to be provided forand not simply for those who use the library.

* Materials selected should meet high standards of quality, content, expression and format.

- The collection should be inclusive and contain whatever materials contribute to the purpose of the library.

- Book selection should aim at proportion and balance--a most difficult task indeed.

- The classic and standard books should be stocked in a library ever and always.

- It is better to buy general books that have better chances of being read than highly specialied ones that may never be read.

- While selecting a book, it is to be ensured that the library is not deprived of a chance to buy a better one that is in great demand.

- Extensive use of inter-library loans should be resorted to for books of limited use.

- Non-book materials should be an integral part of the collection and within limits of availability and usefulness should be provided to the same degree of range and inclusiveness as books.

- It is not a good policy to strive for completness in sets, series or subjects, unless it is absolutely essential to do so.

5. FUNCTIONS OF THE ACQUISITION SECTION

The functions of the acquisition section in a library must mesh with that of every other library operation, and, in particualar, with that of the technical processing section. The acquisition section and the technical processing section should work together to process books and other materials as quickly as possible and at the least possible cost. These two sections share the same records, bibliographic tools (and even computer terminals), and transfer information to prevent duplication of effort. The bibliographic record which ultimately makes the publication available to the user begins with the selectors, developed by the acquisition staff, and completed in the technical processing section.

As pointed earlier in this paper, collection development is a highly specialised and professional task, it should not be left to non-professionals and clerical personnel. A professional acquisition librarian is one who has special skills, chief among these being an intimate knowledge about the ways books and other materials are published, about the sources of supply, both national and international, and an awareness of the current state of the world book trade. He should also be familiar with the theory and practice of cataloguing. In a large acquisition section, managerial skills are also important.

6. PROBLEMS IN COLLECTION DEVELOPMENT

Libraries, particularly those in developing countries like India, face many problems in following a consistent collection development policy due to circumstances beyond their control. Some of the problems[7] are:

- Increasing volume of books and journals that come out from the ever-growing number of publishers;

- Relentless rise in prices of books and journals year after year that outstrip the rather fixed library budget;

- Fluctuations in the exchange rates of foreign currencies;

- Widening and changing scope of activities of the user groups;

- The restrictions on imports, especially of non-book materials like motion films, audio and video cassettes, computer tapes, etc.; and

- Unfair trade practices that are followed by some (and not all) of the booksellers, distributors and publishers' agents.

7. COLLECTION DEVELOPMENT ROUTINES

It is not possible for us to describe in detail all the routines followed in a library for collection development.

However, based on the experience of the first author in the Information Centre for Aeronautics(ICA), National Aeronautical Laboratory(NAL), Bangalore, the collection development routines as followed in NAL are briefly outlined below as a case study:

7.1 Responsibility for Collection Development

The responsibility for collection development in ICA, NAL, rests with the officer-in-charge and his colleagues in the acquisition department and is shared by ICA with the scientific and technical personnel of NAL who are free to make recommendations for acquisition of books and publication. Any technically qualified individual can make suggestions for purchase of documents on the prescribed 'document request form' and send it to ICA through the head of the department concerned. The officer-in-charge is also responsible for the management and control of the library budget relating to collection development.

7.2 Delegation of Powers

The Director of the laboratory has delegated powers to all heads of departments upto US$200 to approve purchase of books, conference proceedings, etc.

Recommendations for journal subscription, purchase of non-book materials like motion films, audio and video cassettes, costly multi-volume sets, publications in series, general books not within the purview of the activities of NAL and all other marginal cases are considered by the library committee and approved by the Director on their recommendations.

The officer-in-charge, ICA in his capacity as a head of department also approves purchase of books which are in the core area of NAL's activities, volumes in series which are earlier approved by the library committee, handbooks and general reference works, government publications, etc.

7.3 Expenditure Sanction

In order to avoid delays in getting the required publications, the document requests received from the heads of departments and the library committee within their powers are treated as having been approved by the Director who is the competent authority to sanction expenditure and these requests are entered in a 'sanction register'. Purchase orders are issued immediately on the basis of entries made in the sanction register. The sanction register is submitted to the Director periodically with all relevant information for approval by the Director.

7.4 Principles of Book Selection

The basic principle of book selection followed in NAL is that purchase of a book is made on the basis of 'demand' and on the basis of evaluation of new books in book review journals, reviews in primary journals, etc., rather than on the mere 'availability' of books brought to the library by local booksellers under the 'approval plan schemes'. While approval plans are not discouraged, selections are not restricted only to the books submitted under these plans.

It is the experience of ICA, NAL that many books would be available in the collection long before such books are brought by the booksellers under the approval plans. This is because purchase orders are issued directly to the original source of supply, as soon as a new publication is noticed in any primary or secondary journal.

In the book selection policy, importance is given to conference proceedings, publication of learned societies, industrial organizations and various other specialised agencies who are not represented in India. These are procured directly from the original source. Another feature of the collection development policy is to issue standing orders for publications in series and for technical report in microfiche under specific subject categories.

In order to cut down delays in procurement of documents particularly from learned societies and international document delivery centres, institutional memberships are applied for if such memberships are allowed. Where such memberships are not possible, revolving deposits are maintained to obtain documents expeditiously by air mail or air freight, as the case may be.

7.5 Collection Development Tools

For the successful building up of document collections, it is essential for any library to maintain a wide-range current and retrospective collection development tools. A selected list of tools that are used in ICA is given in Appendix. Complete bibliographic data for many of the titles is not readily available but can be furnished on request.

7.6 Design of Forms

To accelerate the collection development routines and to obviate the necessity of writing formal letters both by users and the library staff, design of several standard forms is essential.

The routines in a library are similar to the routines in a bank for a variety of transactions. Banks make use of different types of forms to provide various kinds of financial services and libraries have to follow their example in the extensive use of standardized forms.

7.7 Work-Flow in Collection Development Routines

Collection development routines should be designed according to a smooth work-flow chart without any overlapping, repetitions, and unnecessary obstacles which would affect the procurement of the documents quickly.

8. IMPACT OF TECHNOLOGY ON COLLECTION DEVELOPMENT

The traditional ways of collection development which are still followed in many of our libraries would soon become antique and obsolete due to the growing impact of technology on information handling.

Libraries may have to begin using computers for automated acquisitions. Some others may consider linking up to international databases like OCLC Online Computer Library Centre, Inc., Dublin, USA. Others may share a common network with instantaneous electronic access to each other's holdings. Networking arrangements and resource sharing agreements will continue to grow, accelerated by the expanding electronic and telecommunication capabilities and out of financial necessity. Libraries may be forced to agree upon common network policies and protocols on collection development.

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APPENDIX I

A Selected List of Tools and Sources of Information for Collection Development

A. Retrospective

(A) Books

1. Cumulative Book Index. (H.W. Wilson & Co., New York).

2. British Books-in-Print. (J. Whitaker & Sons, London).

3. Books-in-Print. (R.R. Bowker, New York).

4. Scientific and Technical Books and Serials-in-Print. (R.R. Bowker, New York).

5. Walford's Guide to Reference Materials. (Library Association, London).

6. Best Reference Books (an annual listing in library journals). (American Library Association New York).

7. Publishers Trade List Annual. R.R. Bowker. New York).

(B) Journals

8. Ulrich's International Periodicals Directory. (R.R. Bowker, New York).

9. Librarian's Guide (list of journals, serials, house-magazines etc). (Ebsco Subscription Services, Alabama).

10. List of Serials Received by the British Library. (British Library Document Supply Centre, Boston Spa).

11. Union Catalogue of Serials (about 15,000 titles of journals and serials received by over 800 libraries in India are listed). (INSDOC, New Delhi).

12. List of Journals Indexed in Major Abstracting and Indexing Journals, for example, Engineering Index, Chemical Abstracts, INSPEC Science Abstracts and so on.

(C) Conference Proceedings

13. Conference Proceedings Received by British Library. (BLDSC, Boston Spa), 1964-1973, 1973-1978.

14. Index to Published Proceedings, Series: Science, Engineering, Medical and Technology, (5 year cumulative indexes). (Interdok Corporation, New York).

(D) Standards

15. British Standards Annual Catalogue. (British Standards Institution, London).

16. Collected Catalogues of Translated DIN Standards , 17 V. (National Standards Institution, Federal Republic of Germany).

Note: *Cumulative catalogues are available from almost all national standards associations.*

(E) Patents

17. Patents catalogues of national patent go Offices of many countries are available.

18. International Patent Documentation Centre (in microflim), (INPADOC, Vienna).

19. Patents in microflim from Department of Electronics, Government of India and the Patent Information Centre, Indian Patent Office, Nagpur.

(F) Technical Reports

20. Scientific and Technical Reports (cumulative catalogues). (NASA, Washington).

21. Published Searches and Bibliographies (catalogue of cechnical reports on specific subjects). (NTIS, Springfield).

(G) Motion Films

22. Britannica Films. (Encyclopaedia Britannica, Inc., Chicago).

23. Films from Britain, catalogue of films available through the British Council.

24. Catalogue of Films. (American Association for the Advancement of Science, USA).

25. Films Catalogue. (Canadian Film Institute, Ottawa).

26. Catalogue of Films. (Engineering Societies Library, New York).

27. National Films, Bombay. (Catalogues of films produced by DESIDOC, VITM, NAL and other institutions are also available).

(H) Theses

28. Annual Index to Theses accepted in British Universities. (Aslib, London).

29. Dissertation Abstracts International. (DAI Ann Arbor). (Cumulative catalogues by subjects are available.)

30. Catalogue of Theses accepted in Indian Universities. (Association of Indian Universities, Inter University Board, New Delhi).

B. Current

(A) Books

31. *British Books News.*

32. *New Technical Books,* (New York Public Library, New York).

33. *Technical Book Review Index*, (Jadd ublishing).

34. *Choice*, a monthly journal of book eviews.

35. *Publishers Weekly*.

36. *The Bookseller*.

37. *American Book Publishing Record*.

38. *Accession Lists of major libraries*.

(In addition, announcement cards and lists upplied by international booksellers, for example, ro-dart, Inc., Baker and Taylor, Bumpus-Haldane nd Maxwell, etc. may be consulted.)

B) Journals

(38) *Publishers announcements.*

(39) *Announcements in Primary Journals.*

C) Conference Proceedings

(40) *Index to conference proceedings eceived*, Boston Spa. British Library, Document upply Centre (Monthly).

(41) *Published Proceedings*, Series S E, &T (Science Engineering, Medical Sciences and echnology), New York, Interdok Corporation.

D) Technical Reports

(42) *STAR : Scientific and Technical erospace Reports*, Washington D.C., NASA Monthly).

(43) *GOVERNMENT REPORTS ANNOUNCEMENTS*, Springfield, Virginia, NTIS (Fortnightly).

(44) *Reports, Theses and Translations*, Boston Spa. British Spa., British Library, Document Supply Centre.

(E) Theses

(45) *Dissertation Abstracts International*, Ann Arbor, Michigan, University Microfilms (Monthly).

(F) Standards

(46) Monthly catalogues issued by ISI, BSI, ANSI and various other National Standards Associations.

(G) Patents

47. *US Patents Gazette*, (US Patents Office, Washington, D.C).

48. *British Patents Journal*, (British Patent Office, London).

49. *Gazette of India, Section III*, (Controller of Publications, Delhi).

(Contains list of patents filed in the Patent Office, Calcutta. Similar publications from all National Patent Offices are available).

(H) Standards

(50) *ISI Monthly Bulletin* and similar Bulletins issued by National Standards Institutions.

TECHNICAL SESSION-II

MANAGEMENTOF REPROGRAPHIC SERVICES IN LIBRARIES AND INFORMATION CENTRES

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ABSTRACT

Defines reprography and explains briefly its broad areas. Describes xerographic process and growth of the industry with special reference to plain paper copier (PPC). Gives criteria for selection of a PPC and tabulates data of four prominent full colour PPCs. Gives details of a new portable colour PPC with multiple features. Discusses the problems of copyright in photocopying and charging for the service.

1. DEFINITION

The term reprography was first introduced at the First International Congress on Reprography held in Cologne Germany in 1963. Landau[1] defines it as 'the art of producing single or multiple copies of documents whether by photographic or other means'. Ibrahim[2] calls it a 'technology of producingor reproducing visual communication in an inplant operation'. Harrod3 gives a more comprehensive definition as 'the reproduction in facsimile of documents of all kinds by any process using light, heat or electric radiation--photocopies, microcopies, blue prints, electrocopies, thermocopies, etc., also reproduction by methods of duplicating and office printing'.

2. AREAS OF REPROGRAPHY

Taking into account the above definitions, reprography broadly includes photocopying, microcopying, duplicating and in-house printing and in general is characterised by the small scale of operations and non-professional nature of its operatives.

Photocopy is an adaptation of photography, whereby copies can be produced directly from the originals. This process avoids the need for recreation of image to make a master for subsequent reproduction. Micrography deals with images of a reduced size, i.e., microforms (microfilm, microfiche) which requires some special apparatus--viewers/readers to make them readable and the more popular reader-printer which enables a microform to be viewed or read as well as to get a copy of the same if so desired. Duplicating includes hectographic or spirit duplicating, stencil duplicating (also known as mimeography) and gelatin process. Small-scale offset is indistinguishable from duplicating. Even offset litho machines are often described by their manufacturers as 'offset duplicators'.

2.1 Criteria for Selection of Reprographic Systems

While choosing a reprographic system the follwing points need to be considered:

* Running cost (cost per copy), * Captial cost,
* Number of copies required,
*Type of the original to be copied (for example, bound volumes),
* Colour of the reproduced copy (black and white or colour),
*Copying speed (cpm--copies per minute) and covenience of use,
* Skill required for operation,and
* Durability (life of the copy).

In this paper we will deal with photocopying and within photocopying, the electrophotography or xerography.

3. PHOTOCOPYING PROCESSES

The photocopying processes are devided into four groups of methods based on the chemistry of the process and the nature of the sensitive surface on which the copy is made. These are: (a) photographic--the sensitive coating is silver halide as in conventional photography, (b) diazo or dyeline, (c) thermographic or heatcopying,

Table 1 Releationship of various photocopying process

Process	Camera Process (variable size copies)	Non- camera (contact) Process (same size copies)
Photographic Process (silver halide)	Photostat	Negative / Positive (reflex) chemical (diffusion) transfer autopositive (direct positive)
Non- Photographic Process	--------	Dyeline (diazo)
	---------	Thermographic (heat) copying -thermo fax -heat transfer -dual transfer
	Electrophotographic copying may give same or variable size copies.	

and (d) electrostatic or electrophotographic copying. The relationship of these processes is given in Table 1.

4.ELECTROPHOTOGRAPHY/XEROGRAY

Since the main considerations in adopting a photocopying system are eoconomy, speed and use in operation, the electrostatic or electrophotographic method better known as xerography has scored over all the other methods.

4.1 Xerography Process

Chester Carlson of USA produced the first electrostatic copy on 22 October 1938. Later the process was named 'xerography ', a Greek word for dry writing--copying without moist paper or chemicals. This process involves the following steps:

* An electric charge is given to a selenium surface which is ona metal backing. Salenium will not allow the charge to leak away to the metal while it is kept in the dark.

*An image form the original to be copied is projected or reflectedonto the selemium surface.The light from the non-text areas allows the electric charge to disperse to the metal,but the text being dark reflects no light and so the charge is held where the text falls on the selenium surface. Thus,wehave an invisible pattern of electric charges remaining inthe shape of the text or other marks on the original

* Tomake the text visible, carbon powderwith an opposite electric charge is cascaded over the selenium surface. The powder sticks to the surface.

* Paper is brought against the selenium surface and by means of a further electric charge, the powder is transferred to the paper.

*The paper is heated to fuse the carbon powder to the paper. This bonds the image to the paper very securely and carbon being a very stable substance, electrophotographic copies have the advantage of permanence.

4.2 Xerography and Electrofax

Copying on to a plain paper is the original xerography developed by the Xerox orgainsation. When a paper coated with zinc oxide is used, the process is known as 'electrofax'. The advantages of coated paper are that the reproduction of tone illustration is some times better than in xerography and that every copy is in effect a lithographic plate, so it can be used to obtain a hundred or so copies on a small offset machine.

4.3 Growth of Xerox Technology

In 1950, xerox machines were made

availabble to public. In 1960 the Xerox 914, named because of its ability to make copies upto 9 x 14" was introduced. Since then many sophisticated models have come into the market.

The first indigenous commercially available automatic copier known as 'Oce 1250 Electrocopier' was introduced in India by M/s Das Reprographics Ltd., Calcutta which used zinc oxide coated paper. Later M/s Advani Oerlikon Pvt. Ltd. introduced Auto-600 plain paper copier (PPC). There are about 20 firms which are producing PPCs in India. At present Modi Xerox (Modi in collaboration with Rank Xerox) dominates the Indian scene with 43.2 percent of their market share. This year they have introduced the 1038 model which is a programmable desktop copier with many value-added features. But all these models available in the Indian market are black and white. The colour models are yet to arrive in India.

4.4 PPC Market

The PPC market is growing very fast. The number of installed copiers in the United States alone by the end of 1987 reached 4.2 million. The ten top makers of PPC are Canon, Xerox, Sharp Savin, Minolta, Mita, Konica, Harris/3M, Ricoh and Toshiba which control more than 85 per cent of the American market, the first three having 50 per cent of the share.

5. COLOUR COPIER TECHNOLOGIES

The first colour copier was introduced by 3M company in 1974. At present the technology used in colour copier is electrographic, photographic, thermal transfer and cycolor. The comparison of these technologies in the production of quality of colour copies is given in the table given below:

Table 2.- Coparision of colur copier technology

Technology	Speed (cpm)	Hardware quality	Cost (in 000s US $)	Cost per copy (in US $)
Electrophotographic	5-23	Good	20-60	0.10
Photographic	1-1.7	Excellent	16-60	1.15
Thermal	1	Good	10	0.50
cyclor	2	Good	<10	0.60

5.1 Criteria for Selection of PPCs

While selecting a PPC, the following features may be noted for comparison: type, imaging technique, copying paper size, paper capacity, warm up time, copying speed, reproduction ratio, copy colour, density control, multiple copies, dimensions and weight, power supply consumption, etc, The price of a colour PPC is about US$20,000 upward.

5.2 Comparison of Colour PPCs

A comparative study of some of the full colour PPC models, namely: Brother CC 5500, Canon CLC, Canon BJ-A1, Sharp CX-7500, regarding their technical specifications and consumers' requirement is given in Table 3. This can serve as a useful guide for the would be purchasers.

5.3 A Multipurpose Portable Colour PPC

Panasonic has introduced a new personal of producing hard copies of TV/VCR screen images (with the help of an adapter).

6. PROBLEM OF COPYRIGHT

Photocopying (in broader sense, any kind of machine reproduction) comes under the provisions of copyright and affects the library services based on the photocopies produced from periodicals and other copyrighted, reading, material. In USA and the world over, doctrine of 'fair use' permits the reproduction for legitimate purpose of material taken from a copyrighted work to a limited extent, that will not cut into the copyright owner's potential market for sale of copies. Under the term fair use are covered criticism, comments, news reporting, teaching, scholarship or research. In the USA, some guidelines have been laid down for this purpose light weight colour copier which has a number of features to satisfy the needs of the new generation of copier users. Its model called as COPILMAN FN-500, weighs only 6 kg and has 14 colours with copying magnification of 50 per cent, 100 per cent and 200 per cent. It has the potential under which a teacher or his/her agent (for example, librarian) can make one copy of a copyrighted work for research/teaching or preparation therof. Multiple copying for classroom use is allowable only if it meets the test of brevity, spontaneity and cumulative effect. The Indian copyright Act, 1957 as amended in 1983 also permits reproduction of copies when made in the course of fairdealing and for educational or official purposes.

7. CHARGES FOR THE SUPPLY OF PHOTOCOPIES

Should the photocopying service be charged? The answer lies in the policy of the servicing institution. In a government research and development institution where the users are the employees who are dependent on such services, it may not be advisable to levy any kind of charge. But the misuse must be curbed. On a single request which should be once a day, only one copy of one paper usually of not more than 10 pages, may be entertained. In the request the indenter may give an undertaking that the photocopy is required purely for research/teaching/official purposes and that no commercial gain of any kind will be made out of it. This type of undertaking may be necessary from the point of view of copyright.

ACKNOWLEDGEMENTS

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Specification	Model			
	Brother CC 5500	CANON CLC	CANON BJ-A1	SHARP CX-7500
Type	Console	Console	Console	Desktop
Imaging technique (technology)	Cycolor	Electro-photo-graphy	Buble ink jet	Electro-photo-graphy (xero-graphy)
Copy Paper size	Max A4	Max A3 Min B5	Max A1 Min A4	Max A3 Min B5
Paper capacity	200 sheets	250 upper + 250 lower	Al roll + 250 sheets	250 upper + 250 lower
Warm-up time	3 min	8 min	3 min	7 min
Copy speed	1.5 cpm	5 cpm	A4 1.5 min Al 6 min	7.5 cpm
Reproduction (magnification ratio)	1:07 to 2	Zoom 50 to 400%	Zoom 50to1200%	1:07 to 1.41
Colour Copy	Full colour	Full colour	Full colour	Full colour
Density control	7 steps			ATDC
Multiple copies	1 to 99	1 to 99	1 to 99	1 to 99
Dimensions (mm)	676x534x 985	930x735x 946	1416x1225x 1070	665x875x 665
Weight (kg)	107	250	420	160
Power consumption	AC 100-240 v	AC 100-240 v	AC 100-240 v	Rated local AC voltage

SURVEY OF USERS INFORMATION NEEDS: A KEY TO EFFECTIVE LIBRARY MANAGEMENT

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ABSTRACT

The need for improvement of the existing library and information services in India and their future planning in conformity with the nation's educational, social and economic needs have made users' study a must. The present paper is a modest attempt in this direction so far as the study of information users and library management is concerned.

1. INTRODUCTION

'Managementof information is not concerned simply with document, message and data, but with the entire apparatus of information handling, which in most organisations today is in a state of anarchy.

- Peter Vickers

For effective management of a library and to serve the readers effectively, an essential pre-requesite is to study the patterns of information used by them. One form of such study is to evaluate the extent and mode of use of certain library services and tools by users; their information collecting habits and awareness about the information services available in the field.

Guha emphasizing the need to study information users says:

> 'It has often been complained that the documentalists had for a long time neglected one of the most important components of science-communication system, namely the user. They were more concerned with the documents and their bibliographical organization to satisfy the information needs of the users. But very little was known about the exact nature of this need. How exactly the user behaved when he was looking for information; what type of document was used in which situation; how the information was used when obtained, all these were not very clearly known to documentalists.

2. WHY TO SURVEY INFORMATION NEEDS AND HABITS?

The picture of information needs and use is indeed complex. However, if we could analyse the inherent variation in the user behaviour to detect and describe the patterns of information needs and use, it may help the information specialists to improve information services shaping them to match the needs of individual specialists. The data derived form studies of information needs may be of considerable use in managerial decisions. This information might be useful in discovering the type of improvements that are needed to utilise the existing services effctively, as well as answering questions such as: What type of publicity is required to make the sevices and sources better known to the users? What type of new programmes may be started to bring the services in harmony with the information-gathering habits of the users? This type of information may provide clues by which it is possible to know whether to change the information-seeking behaviour so as to exploit the existing resources.

If the library and the information services are to be of significant use to the users, the library staff should be fully informed of the present and the potential users' information requirements, their information gathering habits, problems faced by them while searching for information and their awareness about information services available in the field. For this it is essential to study the user population and to explore their information requirements in order to serve them in a betterway.

3. USER STUDIES

There are no generally accepted definitions in user studies. One review of the user studies has found different words used to describe the same concept and identical terms used to mean different things. The terms information use, users, uses, channel, and sources are all used in different ways as are the concepts of information need, information seeking, and gathering behaviour.

User studies appear to be conducted for two main purposes: (a) studies to explore the flow of information within a given environment, and (b) studies to seek data on the operation of specific serivces, for example, the SDI service. The practical implications of each type of study vary, and this may partly account for the lack of any coherent patterns within user studies.

Paisley[1] suggests that the reasons for so many user studies are: (a) distrust of previous findings, and (b) the conviction that users in a particular environment are unique in their information seeking behaviour.

4. OBJECTIVES OF STUDY OF INFORMATION NEEDS

The study of information needs and uses is a rational activity when viewed as a means to an end. The objectives of studying information needs and uses may be (a) the explanation of observed phenomena of information use or expressed need, (b) the prediction of instances of information use, (c) the control and thereby improvement of the utilization of information through manipulation of essential conditions, the achievement of such objects must be preceded by certain creative activities, (d) the description of observed information use, (e) the definition of convenient and appropriate concepts for describing and dealing with information use, and (f) the theorizing of causal or quantitative relationships between information use and associated factors.

5. TYPES OF USERS

The users of libraries can be broadly classified into actual users and potential users.

Actual Users: Persons who in reacting to their needs, actually seek the servies as offered by the library.

Potential Users: Persons who despite having a need do not seek the service as offered by the library. In other words, these users, in trying to satisfying their needs make use of means often than those available form library. In some cases, such persons even allow the need to go unsatisfied at least for some time. A specific user may be an actual user on one occassion and a potential user on another.

Describing an actual library user would not do justice to the purpose of any study. The investigator has to investigate both actual as well as potential library users.

6. METHODOLOGY

Wood[2] has reviewed and classified the methods that have been employed in studies on information users and their needs. He lists the following five general methods:

* Questionnaires,
* Interviews,
* The diary method,
* Observation, and
* Analysis of existing data.

Information needs have been studied using methods developed for social sciences studies. Basically there are three main methods of collecting data either explicitly or implicitly relateded to users information needs: questioning, observation, and analysis of documentary sources. The most commonly used ones are the survey techniques of questionnaires and face-to-face or telephone interviews[1, 2] because they provide the most easily quantifiable data. Among the other methods used are those based on observation, experiments, simulations, and analysis of various records or documents, such as circultion records, statistical records, diaries, solution development records, and publications in various formats[3]. The two main techniques used in analyzing these records or documents are citation analysis and content analysis. Each method has its weaknesses and biases. So, in some studies more refined techniques have been used like, using the critical incident approach in questionnaires or interviews. Some workers have used combinations of different methods, for example, questionnaires and interviews, to provide internal checks against bias[1,3].

Another example of a non-conventional method is Parker combination of a secondary analysis of previously collected questionaire data with tape-recorded depth interviews of essentially the same population.

Some years ago tape-recorded diaries were collected by the Aslib Research Department from scientists and technologists engaged individually in tackling particular problems of research and development.

It appears that in most studies the sample is selected randomly. However, in some, for example, in the studies of Hogg and Smith and Herner, the random sample was stratified by status grades. Until now, the strongest complaint against user studies has been the use of defective methodology. Menzel[4], and Herner and Herner[3] have expressed concern over the field's failure to adopt sound methods of its own. Mistakes of the 1950s were repeated in the 1960s. Inconclusive studies are conducted to fill gaps left by previous inconclusive studies.

7. SCENE IN INDIA

The topic of information needs and use has been discussed in India from 1962 onwards. 'Users and library and information service' formed one of the topics at the Second IASLIC Seminar held in 1962. Systematic studies too began in 1960s only. One of the users' survey done concerned teachers and research scholars in the field of chemistry. This was followed by S.R.Raganathan's annotation on users survey (1970). From 1968 onwards, users in different fields of science and technology began to be concerned. The aspects covered include classes of information in specific fields, evaluation of specific services or systems, channels or media of communication used, pattern of information use and flow, and user behaviour.

The fields covered include science and technology, nuclear science and technology, physics, chemistry, biology, food science and technology, leather technology, electrical engineering, electronics, armament technology, etc. Exhaustive surveys have been conducted in the areas of chemistry[5], and also in electronics, physics, food science and technology and electrical engineering . Studies in chemistry and electronics were carried out in the late sixties and some of the findings may not be relevant today.

8. IMPLICATIONS OF THE STUDY

Scientific and technological research has become a very important component of the human activity, and it has been realized universally that progress of any society is not possible without it. This realization has led to the following two consequences:

* Governments through out the world are spending huge amounts on scientific and technical research; and

*Thousands of researchers are engaged in research and development activities in science and technology at various levels in every country of the world.

These developments, in their turn, have resulted in proliferation of scientific and technical literature; orginating from different countries in numerous languages and in a variety of forms. This phenomenon is known as 'literature explosion' or 'information explosion'.

The study thus has important implications for the science communication system in India, and consequently for the international science communication system.

9. CONCLUSIONS

The literature on information needs and uses in science and technology is growing in size and maturing in quality. We are moving towards strong guidelines for information system design and evaluation. More adequate theories of information processing behaviour will follow.

On the one hand information needs have proved to be extremely complex and varied, and user studies have so far proved inadequate to the task of completely revealing the nature and needs of information users. On the other hand it is very clear that even if we were to know exactly what would meet users' requirements in full, we would not be able to provide it to all users in all circumstances.

The users need for information has remained the same over the years. Basically the services of libraries and information centresdesigned to fulfill these needs have not changed. It is the way in which the services are provided that has changed. Methods of providing services will continue to change as the amount of information increases and as new technologies are developed. As libraries and information centres become more electronic, their personnel need information-handling skills to enable them to instruct end-users. They will need to promote awareness about new developments, new techniques, and new sources of information. It will be necessary for them to be knowledgeable about information sources, both internal and external, and document collections. They will act as consultants when the end-user has problems or needs advice on database sources for various types of information. They will also be responsible for developing the information technologies necessary to develop, maintain and access systems of information. Quality and cost of information will be high on their list of priorities. They will need to know the costs of information systems and resources and budget accordingly.

Although more and more librarians and others now appreciate the value of use surveys and are busy carrying out local, regional and national investigations, many of them are not fully aware of the problem and techniques associated with such stduies. As Maurice B. Line in his book on library surveys states:'Too often the result of a survey is an indigestible mass of badly interpreted data collected from a poorly chosen inadequate sample by unreliable and invalid methods according to an ill-conceived design'.

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MANAGEMENT OF SCIENTIFIC AND TECHNICAL LIBRARIES

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ABSTRACT

Management is an important activity in an organisation, including libraries, and especially in scientific and technical libraries because of their basic function of providing exhaustive information to the users in an efficient manner. The basic approach to management in scientific and technical libraries is to formulate objectives, goals, plans and policies and to accomplish them utilising the available resources in an economical and effective way. The management aspects involving planning, budgeting, organising, staffing, motivating, training, evaluating, monitoring and communicating, etc. are discussed. Collection and analysis of statistical data and automation of library operations are also considered as essential parts of management. It has been pointed out that library management depends much on managerial skills rather than on technical skills. Provision of customer-centered information services should be the goal to be accomplished by the managers in scientific and technical libraries.

1. INTRODUCTION

In a library organisation, management is a process followed for getting the desired output, using the available resources in an economical and efficient manner. It involves planning, organising, directing, staffing, coordinating, budgeting communicating, motivating, monitoring, controlling, evaluating and reporting, etc. In different situations. Management is all the more important for libraries because of the meager resources available to them. In scientific and technical libraries, the provision of special information services to the users is imperative. It includes retrieval of information both from the resources available in the library and from the scientific literature available in other organisations at national and international level, to provide for pin-pointed and exhaustive information expeditiously to the users.

Libraries with activities centred in the areas of science and technology are located in a variety of organisatioins such as industrial organisations, government departments, research institutes, departments in universities and engineering colleges, professional societies and associations, etc. These libraries originate because of specific locallised needs for organised information services. The special libraries are required to provide regular and systematic informatior services covering immediate and foreseeable future information needs of the parent organisation. This necessitates the acquisition and maintenance of an adequate collection of books, periodicals, pamphlets government publications, standards specifications, technical reports, conference proceedings, maps, drawings, microforms, computer programs, databases, etc. issued from the multitude of publishing bodies and other agencies. All these items are to be adequately classified and indexed and filed accurately for efficient retrieval of information.

Information retrieval is the key activity in any scientific and technical library. The efficiency and effectiveness of library services depend on the management of the resources, i.e., the judicious collection of documents in all forms including published and unpublished sources, and access to world-wide sources of information. It is also effected by the utilisation of modern methods and techniques of information storage and retrievel.

In recent years, the scientific and technical literature has increased in volume at such a rate that improvements over the conventional methods of copying have been sought. With the advent of computers, most of the activities have been automated. New technology is changing the face of publishing world. Under the circumstances the library manager faces a large number of problems such as shortage of funds, inadequate staff, non-availablity of various databases online, intricacies involved in searching the information from various sources, etc.

2. NEED FOR LIBRARY MANAGEMENT

The squeeze on library management is coming from three sides: institutional management, clientele and library staff. The role of library managers is growing increasingly complex as the professionals demand a greater voice in decision-making, the financial authority's demand for more specific accountability and users' complaint about officious and unresponsible services. The most difficult problem for management, in Peter Drucker's words is '... how to imbue the staff with a sense of mission that overarches individual professional goals to integrate them into the institution in which their professional goals are secondary'.

Achievement of this integration is likely to be a painful process for both management and library professionals. However, it is essential if libraries are to become effective service organisations. Goals congruence necessitates the abandonment of traditional approaches and methods, encouragement of innovation, and a commitment by the staff to change their behaviour and attitudes.

The responsibilities for providing direction and leadership in any organisation is the major task of managers. Library managers need to be made aware that they are responsible for leadership. Their failure to give directions and take up the challenge of customer-centred services exacerbates the severity of the pressures. They must define the library goals and provide direction to library staff to achieve these goals.

The change to customer-centred services in libraries carries both burdens and risks for management. The major burden is management control which necessitates monitoring the system to see that resources are obtained and used effectively to achieve library's goals. Managment also has the burden of evaluating the performance of librarians, rewarding those persons who contribute positively to the organisation as well as those who contribute to the library profession. Given the library professional's lack of motivation to change and the inertia of management, it is unlikely that significant changes will occur until managers realise that they are responsible for the outcome of the professional work in terms of organisational goals focused on satisfied customers.

3. MANAGEMENT SKILLS

Accomplishing the library's goals and providing good service can be more dependent on management skills rather than on technical skills. Management skills can be split into two parts; skills useful for operating in larger environment, i.e., the parent organisation or the corporate body, and skills within the library, i.e.,those that help to get the major functions accomplished. These includes staffing, training, motivating, evaluating, and communicating with staff; orgainsing the library so that the work can be done effectively; planning, setting and communicating the goals. Skills within the larger organisation are usually used to get the resources which are needed to acomplish the library's functions and goals. The leadership is focused upward and outward rather than within the library. Skills required include planning and budgeting policies, and effective communication with the top management.

4. PLANNING

Planning is essential in managing the library, and it is one of the most effective ways of communicating with the top management. Planning covers such relatively well-defined tasks as forecasting what periodicals will cost next year, planning to order a microcomputer for automating the library operations as well as much less-defined and broader tasks such as what changes are coming in the parent organisation that will effect the library, what new technology means to the library in 5-10 years from now, finding factor that are affecting the scientific and technical libraries, i.e, uncertainty and inadequate levels of funding of scientific research, priority areas in research, etc. Dealing with these broader aspects is difficult but has great potential for library operations and management. Collecting information about the library and its environment, data about users' needs, etc. are helpful in planning. Assessing the existing resources, formulating the goals and objectives, making plan for achieving the objectivies with the existing resources or augmenting the resources and implementing the plans, and monitoring the progress are all basic steps in planning.

5. BUDGETING

Although budgeting is a part of the planning process, yet the methods of charging back costs and guidelines for the appropriate proportions between various items in the budget need consideration. Charging back for services implies that they are in some fashion charged against the department, unit or the project supported.

The second factor to be considered is about the guidelines available in the budgeting process, how much can be spent on various categories, i.e., periodicals, books, online services, staff, etc.

All such aspects need in depth studies of budgeting patterns in various settings and finally planning for the one's library.

6. ORGANISING

Organising skills seem to be more common among librarians than planning skills. Organisational choices include whether to organise around form, function, or geography; whether to centralise or decentralise; and the size of the span of control. Most scientific and technical libraries face the problem of deciding whether to make technical reports a separate section which includes all aspects of handling reports, including acquisitions, cataloguing, information retrieval, and current awareness, or to have a common cataloguing section catalogue technical reports as well as other formats. Although there are no concrete rules for any organisational issue, much depends upon user requirements and the library environment.

7. COMMUNICATING

Managers must be able to communicate well both orally and in written form. In communicating with top management it is useful to figure out how the manager prefers to communicate, and then follow the same. The annual report is a common means of formally communicating what has been accomplished during a year, pointing out trends which will influence future performance. It can also be used to point out problems to management and users and to prepare the ground for budget requirements. Graphically-presented statistics are a great help in presentations to top management. The manager needs communication from the staff as much as or more than the staff needs communication from the manager. Managers depend upon communication from their staff to let them know problems which need to be dealt with. The managers must communicate with the staff regarding the objectives, plans and policies of the library.

8. PERSONNEL MANAGEMENT

Personnel management includes staffing, training, motivating and evaluating staff. Staffing is often structured by the policies and procedures of the parent organisation. But the library will have to decide about the level/position of the staff required, write the job description and often recommends the applicants to be interviewed.

A good orientation to the larger organisation is an essential part of any new employee's training. Adequate training should be provided on various functions and operations of the library. The staff may also be sent for refresher/training courses.

There are various theories of motivation. Some are motivated by achievement, some by social responsibility, and some by participatory management. An organisation must view some employees as motivated, willing contributors to the organisation, yet at the same time be prepared for employees who veiw the job as only a place for pay check in return for putting in a specified amount of work.

It is very important to evaluate the performance of the staff. Performance evaluation can be one of the tools of motivation. The best performance evaluations are focused on goals and objectives. Evaluation process is also closely tied with communication. One of the most important factors in performance evaluation is whether or not the staff understand clearly what is expected of them. Any failure on the part of the staff must be communicated to them, and a chance be provided for improvement.

9. STATISTICAL DATA

Collecting and analysing statistical data is an important management activity. The statistical data is very helpful in communicating with the higher management as well as in projecting the achievements. User statistics are the best statistics to use in evaluation, as they are usually measures of output. Statistics of circulation, inter-library loans, uncharged use of materials, shelf availability of library loans, information services, etc. are very helpful. These statistics become even more useful when they are combined with other information. For example, statistics to develop ratios of number of staff per user, number of staff for information request, etc. can be much more useful than raw data.

10. LIBRARY AUTOMATION

Automation is clearly one of the most important functions of scientific and technical libraries. A good automated system can make a library truely a service organisation. Any number of factors can precipitate the automation decision. A library's first step towards automation can stem from a desire for increased productivity or cost savings. Automation may be considered to address needs to perform tasks less expensively, more accurately and more quickly to handle tasks which can no longer be accommodated by the manual system due to higher volumes or costs; to perform tasks which cannot be done by a mannual system; to prevent duplication of efforts, to improve control over operations, etc.

Automation can be done as a pilot project to gain familiarity with computers and software, or because of the availability of equipment or because of pressure from management. Computers are getting more powerful and cheaper day by day and automation as such are within the reach of any library and can provide numerous benefits to the library staff and the users.

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PEFORMANCE APPRAISAL SYSTEM IN A GOVERNMENT-FINANCED LIBRARY OF A HIGHER LEARNING INSTITUTE

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ABSTRACT

The objectives of a library of a higher learning institute as related to the parent body's goal are discussed. Staff members' responsibilities in this connection are stressed. As a need for personnel management is felt in a library, assesment of potentials, training needs, performance and conduct etc. through 'appraisal system' is recommended. Final performance appraisal through a combination of self-evaluation report, self-explanatory routine work records and supervisor's unbiased report is explained. Future staff placements and awards like upliftment and training opportunities should be guided by the outcome of the preceding study. Sample data recording format leading to appraisal record for a work unit is provided.

1. LIBRARY'S OBJECTIVES AND ITS STAFF

The officer managing the library of a higher learning institutehas many problems to face. Besides financial problems, he must decide how to build collection, what kind of bibiliographical control must be provided, what resouces in the collection can best serve the faculty and students and how to make public services effective and how to provide instruction in library use and so on. Each of these decisions is dependent on persons for their management, i.e., the library's staff is ultimately responsible for developing book collections and providing catalogues and other services. So, people form themselves into an organisation having common goals, and it is through people the goals can be achieved.

The personnel goals of an institute library are job productivity, individualised personal development and satisfaction, and overall advancement of library programme. These can be promoted through an organised programme of personnel development based upon training and supervision.

With the growth and development of the modern management sciences, the area of personnel management is assuming an increasingly important place in all organisations. In a government-financed higher learning institute library which has an objective to cater to the information requirements of its researchers, teachers and students, a scientific and rational personnel management is even more necessary to exploit fully the potential of the staff. In order to draw up the talent from within the organisation itself, the appraisal system helps the management to reach a concrete promotion/re-allocation policy and a control mechnism.

2. APPRAISAL SYSTEM: WHAT AND WHY

The appraisal system may take the form of cumulative assessment indicating the potentials and capabilities of the individual employee for shouldering higher responsibilities. Both to the organisation and to the individual staff, this is an important device which would help to feed the organisation's performance. Though library is a non-profitable organisation in terms of money, much beneficial off-the-screen services are rendered by the library for any developmental project or research work to aid an organisation achieving its goal. The librarians/ staff play an important and responsible role of interface between the documents/information and the reseachers/users. The performance appraisal of the library staff is expected to result in an assessment of (a) growth potential of an individual, (b) corresponding training needs, (c) performance and capability of individuals for their job-allocations and permotion, and (d) conduct, discipline, etc. of the appraisees enabling the organisation to evolve a suitable control mechanism. On the other hand, this device would lead to improve the total organisational health through optimal utilisation of human resource potential in the interest of the organisation, and simultaneously, it also motivates the appraisee towards performing his best to the organisation.

This article deals, in brief, with the various methods and criteria on the basis of which the performance of the library staff could be evaluated, and they could be properly initiated and motivated to get the best performance out of them.

On the basis of the evaluation, they are to be suitably rewarded, through promotion or oppourtunity for specialised training or further higher study. It is denying of the fact that the library is such a service-oriented organisation where the performance in terms of quality is very difficult to measure. So, the quality and style of performance together with the continuous assessment of various factors influencing the person's performance and behaviour are the means towards the appraisal of the performance of the library staff.

3. SUBSYSTEMS OF LIBRARY

The system concept helps the manager to recognise the nature of the complexity of the problems and operate within the perceived environment. Library as a whole is a system which is the subsystem of the complex supersystem, i.e., the parent organisation. As a system, library has got its subsystems through which its objectives will be achieved. The subsystems of the library can be recognised as acquisition, processing, circulation and the reference/documentation/information service. Each subsystem has got its own fuctions and the staff associated with it are endeavouring to reach the goal of each subsystem. And ultimately, all the subsystems will be synchronised to meet the final goal of the system, i.e., the library. Management is the most important aspect within the library which co-ordinates the activities of the subsystems and relates them to the environment. Managers are needed to convert the disorganised resources of men, machines and money into a useful and effective enterprise. So management essentially is the process where these resources are integrated into a total system for objective accomplishment. So, in this process, human resources are one of the important elements. Evaluation and estimation of the respective roles of these elements in achieving the objectives are to be done properly.

In a word, the total operation within a library involves every thing from building document and collection to its selective retrieval for the target users. In the first instance, the staff of the acquisition unit are usually engaged in checking and indexing of the newly arrived documents. Before placing orders, the documents are to be checked with the existing collection of the library. Then accession numbers are assigned to the documents, so that the inventories for the interim period are maintained. All the jobs of the concerned library staff could be evaluated in terms of both quality and quantity. In the processing operation of bills, number of bills to be quantified and the accuracy could be measured if there is no complaint from the audit. In the processing unit, in classification, cataloguing and inventory maintenance, the volume of the work could be quantified and the accuracy could be measured. In the circulation unit, total number of requisitions and total number of volumes maitained in the stack for a definite period, for example, monthly, could be quantified. Records also reveal that how many requests are satisfied both directly and indirectly. In the reference section records can be easily maintained on the number of queries attended and the extent of enquirer's satisfaction achieved. Throughout all the above operations, the factual data both from quantity and quality of the performance of the concerned staff should be evident from the routine work procedure.

4. SELF-EVALUATION REPORT

As much of the library work is not production oriented, it would be better if the performer himself would record and report about his accomplishments for a specific period. And these records should be subtantiated with as much factual data as possible. This self-evaluation along with the quantification of achievements would form the basis of this reporting system.

A sample for self-reporting system for functional units of a large library is provided in the Annexure-I. This type of record would be a self-explanatory one about the performance of an employee, if followed with suitable modifications.

5. SUPERVISOR'S REPORT

With this self-evaluation reporting system, there must be recommendation of the immediate superior or reporting officer (assistant librarian of the service unit). While commenting on any employee's performance under him, the reporting officer should depend on evidence based on data and not on mere memories of the nature of the concerned employee and his behaviour.

6. INTERPERSONNEL RELATIONSHIP

The following factors have much influence in the appraisal system of the staff of any library.

Interpersonnel relation may be mentioned at the beginning. To run the administration efficiently, the superior should be free and unbiased to his subordinates. The subordinates also should be sincere to their work so that there exists a high mutual trust, high degree of compliance and adjustment among the personalities--the superiors and the subordinates. Both the groups should posses such an attitude that they are endeavouring together to reach a definite aim.

Those tasks which require extensive innovation and growth, greater support from the management is needed. Performance sould be better on the part of the employees if the task requirements are fixed in collaboration with the subordinates concerned.

Performance levels can be fairly improved by systematic monitoring of the employee. It would be even better if the progress is monitored by the employee himself or jointly with the superior. It is important to point out that the psychological factors too exert a major influence on the performance of the subordinates and the success of the superior has to be judged from the extent to which the respective superior can create a favourable psychological environment around the subordinates. Equally imprtant is the superior's,i.e., librarian's capacity in terms of work competence and counselling skills.

Another important factor in the library work is to maintain a hearty relationship among the colleagues as it is a type of team work. As its final aim is to render efficient service to the users, librarians/staff sould be cordial enough to them.

The combination of the preceeding three important elements, i.e., (a) the self-evaluation report, (b) the self-explanatory work routine stating factual data, and (c) the unbiased reporting of the supervisor--could facilitate the criteria-wise ranking on the basis of which the performance level and propensities of an employee could be evaluated leading to proper placement or upliftment.

7. CONCULDING REMARKS

The majority of the services of a library are unrecorded. But the educational and professional skills along with the experience work well to equip the staff upto the right degree to render such a personalised service which is very difficult to measure but cannot be ignored.

The libraries of higher learning institutes are becoming highly organised with thier men and machines. The new technology demands the special training to be imparted to the staff.

To the staff of large libraries, the participative management would be a suitable one.

In order to improve orientation to each library operation, reassignments for short period can be made to other jobs, perhaps accross departmental lines and such an exchange can provide a substantial learning experience.

PROCESSING UNIT
XYZ INSTITUTE LIBRARY

Statement of work during the ....

A INPUT/OUTPUT OF BOOKS:

A1 Input :

1 From Acquisition Unit : (i) Complementary (ii) Purchased
2 From Stack: (iii) Exchange

A2 Output :.........(including......urgent books)

New Books :......			Correction	Reprocessing
General	Reference	Rest. Rep		
		Thes. Others		

B CLASSIFICATION OF BOOKS :...

B1 New titles:..... B2 Reclassification:.....

Staff^1

Staff^2

Staff^3

Staff^4

C CATALOGUING OF BOOKS

Staff^1

Staff^2

Staff^3

Staff^4

C1 New titles	C2 Addl Books	C3 Recataloguing	C4 Check.of Auth marks	C5 Cat. cards typed

D FILING OF CATALOGUE CARDS.....

D1 Alphabetical part : Staff 1

1 ACTS:
2 Subject index
3 Bulletin index

D2 Classified part : Staff 2

1 Shelf list
2 Classified

E PREPARATION OF SUBJECT INDEX : Staff 3

F OTHER TECHNICAL TYPING JOB: Staff 4

F1 Stencil for bulletin : (List of additions)
F2 Annual report:
F3 Monthly report :
F4 Weekly report:
F5 Weekly list of processed books:
F6 Weekly bulletin
F7 Typing/retyping of cards

1 Subject index

2 Catalogue cards

F8 Notes/Proformas:
F9 Letters:

G MAINTENANCE

1 Different authority files

2 Notes for future corrections:

H WITHDRAWN OF CATALOGUE CARDS/BOOKS FOR ADDITIONAL INFORMATION/CORRECTION

H1 Books:.....	H2 Cards:.....
1	1
2	2
3	3
4	4

I OTHER WORKS

I1 Checking of books received from Acq Unit/List prepared for processed books

I2 Sorting of books received from Acquisition Unit:
I3 Call Number writing on spine of books: respective cataloguers
I4 Sorting of catalogue cards :
I5 Stamping on books and cards :
I6 Books (processed during the previous week) taken out from TPU to Circulation

Staff 1

Staff 2

I7 Display of Jackets:

J BULLETING WORK : (List of additions)

J1 Weekly bulletin

J2 Monthly bulletin

1 Preparation:
(a) Classified part
(b) Subject index part

2 Stencil cutting
3 Cyclostyle
4 Distribution:

K ENQUIRIES ATTENDED

1 General Queries
2 Reference queries

L COMPILATION OF WEEKLY, MONTHLY, ANNUAL REPORTS/LIST STATEMENT, etc.

	L1 Annual Report	L2 Monthly Report	L3 Weekly state- Report
Staff1			
Staff2			
Staff3			
Staff4			
Staff5			
Staff6			

M ANALYSIS OF STATISTICAL DATA

Power	No	Vecant	Exis-ting	Working days	Nonworking/ leave days	Technical man days	No of bk processed	Man-bk ratio
Technica						Proce-ssing:		
Common						Bulle-tin :		
Other						Other work:		
						Total:		

REPORT OF THE RAPPORTEUR GENERAL OF THE CONFERENCE

Pandey S.K. Sharma
Planning Commission, New Delhi

Saturday, 11 November 1989

INAUGURAL SESSION

The inaugural Session of the Seminar was held on 11th November 1989. Shri RS Sethi, IAS Development Commissioner, Government of Goa was the Chief Guest and chaired the session and inaugurated the Seminar in the absence of Dr. Sheikh Ali, Vice-Chancellor, Goa University.

Shri VR Navelkar, Chief Librarian, Goa University welcomed the guests and the delegates and assured all co-operatioin during the Seminar.

Shri SS Murthy, President, AGLIS and Director, DESIDOC, Delhi presented a vivid picture of the activities and achievments of AGLIS and informed the gathering that it has mutually been agreed to start a Goa Chapter of AGLIS.

In his comprehensive and yet compact inaugural address Shri RS Sethi, highlighted the significant role of libraries in the society and appreciated the efforts of AGLIS towards the modernisation of library services. He welcomed the decision of opening the Goa Chapter of AGLIS and assured all possible support, including financial support to the AGLIS through the local chapter. This assurance and encouragement received from the Development Commissioner will certainly nourish the new born baby and would ensure its healthy growth.

The Inaugural Session ended with a hearty Vote of Thanks to the guests and delegates proposed by Shri SN Mehta, Secretary, AGLIS.

Sunday, 12 November 1989

The second day of the seminar, i.e, the 12th November. 89 was devoted to presentation of papers and was divided into two Technical Sessions.

TECHNICAL SESSION-I

In the pre-lunch session, four papers were presented. Shri NV Satyananarayana, Managing Director, Informatics (India) Pvt. Ltd., chaired the Session. Ms Kumud M Apte, Librarian, SS Dempo College of Commerce and Economics, Panaji was the Rapporteur.

In his paper titled Networking of CD-ROMs, Shri NV Satyanarayana described the genesis and development of CD-ROM, enumerated its advantages and dwelt upon its utility for libraries. He emphasised that it is immensely effective, economical and a helpful compact storage device and hence librarians and information scientists should come forward to adopt it. The paper invited a wide and lively discussion. It was realised that lack of resources is certainly a major factor of its non-adoption, but at the same time it was also felt that lack of initiative to adopt this new technology is also a factor for its non-adoption.

The paper entitled Technical Processing in Libraries: Limitations and Prospects received from Prof. MA Gopinath of DTRC, Bangalore was presented by Shri MP Tapaswi, Documentation Officer, National Institute of Oceanography, Goa. The paper highlighted the problems relating to organisation and functional aspects of technical processing and also problems in the flow of documents and suggested some solutions for overcoming these problems.

The paper entitled Studies on Use of Library Collections by Scientists, Engineers and Technicians submitted by Dr. MS Sridhar, Dy Head, Library and Documentation, ISRO Satellite Centre, Bangalore was presented by Shri Gias Khan Usman Khan of Goa University Library in the absence of Dr. Sridhar. The paper was devoted to user-study. The paper referred to various user-studies conducted in foreign countries, classified users in various types, defined related terms expeditiously, discussed correction of the use of the library collections with user characteristics and similar issues and emphasised that regular user-studies must be conducted in India also so as to fulfil the needs of the users and also assess the performance of the library.

The last paper of the session was Collection Development in Libraries and Information Centres, by Shri MN Seetharaman and Shri N Gnanasekaran.

TECHNICAL SESSION-II

In the post-lunch session, four papers were presented. The Session was chaired by Shri VK Rangra, Dy Director, of DESIDOC and Shri Gias Khan Usman Khan of CES College of Arts and Commerce was the Rapporteur.

In his paper entitled Management of Reporgraphic Services in Libraries and Information Centres, Shri Rangra described reprography, explained briefly its broad areas, and pointed out criteria for selection of plain paper copiers. The paper was discussed at length.

The paper titled Survey of Users' Information Needs: A Key to Effective Library Management by Shri Rajeev Vij of DESIDOC, Delhi was presented by Shri N Gnanasekaran. The paper emphasised on the needs for improvement of the existing library and information services with respect to users' needs in India and their future planning in conforming with the nation's educational, social and economic needs.

The third paper was Management of Scientific and Technaical Libraries by Shri SP Gupta and Shri SN Mehta and the fourth paper was Performance Appraisal System in a Government-Financed Library of a Higher Learning Institute by Shri Nanda Dalal Basak and Binod Bihari Das.

Monday, 13 November 1989

CONCLUDING SESSION

The Concluding Session was to be chaired by Dr. Sheikh Ali, Vice-Chancellor, Goa University but due to his indifferent health was chaired by Shri VR Navelkar, Librarian, Goa University.

It was recommended that facilities should be created in each of the government libraries and information centres for sending the staff for orientation courses to make themselves familiar with the development of modern information technologies.

The seminar has touched a variety of topics connected with management of libraries, adopting of new technologies and thus has been very useful for librarians and information scientists. We have achieved all possible co-operation from the local librarians.

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(Formerly Government of India Librarians Association—GILA) (Regd.)

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The objectives of the Association are :

(1) To work for the advancement of library and information science.

(2) To promote the application of progressive ideas and information technologies in library and information work.

(3) To formulate standards, norms and guidelines for the library and information work.

(4) To develop appropriate mechanisms for resource sharing among government libraries and information centres and establish linkages for cooperation with national and international bodies engaged in the promotion of information work/services.

(5) To provide consultancy in library and information activities.

(6) To improve the professional calibre of the working personnel by engaging education programmes, holding professional conferences/seminars and publishing professional literature.

(7) To foster a sense of dedication among the members for upholding professional ethics and service to the users.

(8) To work for improvement in the status and service conditions of government librarians and information specialists in the country.

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LIBRARY MANAGEMENT AND ORGANISATION : SOME THEORETICAL ASPECTS

VK RANGRA*

President, AGLIS, c/o DESIDOC, Delhi-110 054

INTRODUCTION

Management, planning, organisation, c.are much talked of topics in the library cience literature. These are basically the anagement terms. It is therefore necessary at we know, what they actually mean in the anagement science.

MANAGEMENT

Management is a distinct process onsisting of planning, organising, actuating nd controlling, performed to determine and ccomplish stated objectives by the use of uman beings and other resourses. In other ords,there are distinguishable activities hich make up a management process. urther these activities are performed to ccomplish stated objectives and they are erformed by people with the help of other esources. These activities are precisely efined below.

) *Planning* is the selecting and relating of facts and the formulation and usage of assumptions regarding the future in the visualisation and formulation of proposed activities believed necessary to achieve desired results.

) *Organising* is the establishment of effective behavioural relationships among persons so that they may work together efficiently and gain personal satisfaction in doing selected tasks under given environmental conditions for the purpose of achieving objectives.

(c) *Controlling* is determining what is being accomplished, that is evaluating the performance and, if necessary applying corrective measures so that the performance takes place according to plans.

(d) *Actuating* is getting all the members of the group together in order to want and to strive to achieve objectives of the enterprise and of the members because the members want to achieve these objectives.

2.1 Levels of Management

The basic principle of management is the distribution of responsibilities or its decentralisation. Three levels of management are generally accepted:

(a) *Top Management:* Formulates policies and principles and financial matters, for example, Director of library/Chief Librarian.

(b) *Middle Management:* Responsible for carrying out the policies and principles as laid down by the top management, for example, Heads of various departments of the library.

(c) *Lower Management:* Supervises the work of the rank and file, and serves as administrative link between the workers and the authorities, for example, Supervisors, Senior Library Assistants, Office Superintendets.

---

*The author had his training in management at Defence Institute of Work Study, Mussoorie and Administrative Staff College india, Hyderabad.

2.2 Goals of Management

In a layman's language, the goals of management are:

(i) To learn how activities take place;

(ii) To learn why, when and where things are done;

(iii) To improve working conditions, service/productivity skills of employees, utilisation of space and material; and

(iv) To simplify the functions by eliminating the non- essential and reducing repetitive tasks.

3. PLANNING

The purpose of planning is to coordinate actvities of an organisation and direct them towards the established objectives. Successful planning provides the proper direction for activities within the organisation, i.e., all activities and all units moving in a single direction as specified by the organisation's objectives. A plan identifies what is to be implemented, who is to implement it, and when it is to be implemented. Planning relates to both the present and the future. Planning is a continuous activity existing at all levels of the organisation.

Planning conserves time, a critical factor in any organisation. It is the only way to conduct uncertainty and accommodate environmental changes. Planning focuses attention on the objectives of the organisation. It is a critical element in gaining an economical, efficient operation. Formulation activity in planning requires consideration of the efficiency and consistency with which work is being performed. It directs the efforts of the organisation to achieve a coordinated workflow. Planning is a major factor in the control of the organisation. Planning provides the standards by which the performance can be measured and ensures that the organisation is going to the right direction.

3.1 Steps in Planning

(i) Determine the alternative courses of action;

(ii) Examine the courses of action in terms of objectives;

(iii) Select the course of action that seems most appropriate; and

(iv) Formulate a plan based on this action and produce derivative plans.

3.2 Points for Consideration in Library Planning

(a) *Description of the Organisation:* Formal policy statement of aims and objectives; types of activities (products/services); and trends of the growth of the organisation.

(b) *Library's Role in the Organisation:* For the analysis of the user group, the library is expected to serve in terms of (i) size of the users; (ii) general library requirements in terms of types of service and type and extent of library collection; (iii) developing the library needs--whether expansion and intensification of existing services or greater diversification, etc.; (iv) how adequately the library collection meets the present requirements; and (v) whether resource sharing with other libraries in the town is possible.

(c) General description of the present and the planned (future) library.

(d) *Library Budget:* Forecasting

(e). *Library Collection:* Space requirements for books, periodicals, reports, microforms, computer and audio/video tapes.

(f) *Library Equipment:* What items are required to be replaced and added?

(g) *Library Staff:* Number of professional and non-professional staff required and the detailed job description.

(h) *Library Automation:* Why computerisation is needed? Which areas are to be computerised? Which computer system and software package is to be used? Which areas are to be computerised? If to be done in a phased manner, what are the priorities?

(i) *Joining a Library Network for Resource Sharing:* What are the requirements for joining a network? What are the obligations vis-a-vis the gains?

4. ORGANISATION

Library organisation relates to the design of the structure and the grouping of positions, which will best carry out the library's planned objectives. it involves the designing of the structure of authority, defining and classification of posts, their relationship with each other and ensuring proper coordination for achieving the objectives of the library.

Library organisation demands the following actions:

(a) Defining the functions of the various departments/groups in the library such as acquisition, technical processing, maintenance of collection, circulation, reference service and technical administration.

(b) Writing a detailed procedure for work involved especially for acquisition, borrowing rules, inter-library loan, weeding out/writing off of loans reported in stock verification, etc. which involve finacial and audit requirements. A mannual covering all or important aspects may be prepared, to serve as guide to the staff.

(c) To specify the duties of the staff at various levels leaving scope for flexibility to avoid watertight compartmentalisation.

5. PERSONNEL MANAGEMENT

Personnel management is a staff function. It is advisory in nature. It recommends, cooperates and counsels. These responsibilities may take the form of the following activities:

(a) Formulation of policy and development plans;

(b) Staffing, which includes identifying, securing, selecting and placing suitable manpower;

(c) Controlling the working condition in order to develop and effectively utilise the services of personnel on the job;

(d) Providing various services to the employees there by to encouraging self-improvement and increased efficiency;

(e) Provision of continuing education and training programmes for the career development of the employees; and

(f) Review and appraisal, including the maintenance of personnel records and personnel research.

5.1 Functions

These may be grouped under nine broad headings, viz. (i) job analysis, (ii) job evaluation, (iii) staffing, (iv) recruitment and selection, (v) tests, (vi) placement, (vii) induction, (viii) training, and (ix) wage and salary administration.

6. ADMINISTRATION

Library administration involves the techniques by which the aimsand objectives of an organisation are fulfilledata minimum cost and effort. Administration mainly concerns with the directive functions through which and administrator unifies the efforts of all individuals engaged in the enterprise and guides their activities in the right direction. Administration is that function of management which actually executes or carries out objectives for which the enterprise is organised. This function initiates the work to be performed, sees that personnel are judiciously placed with respect to each of the task and trained to carry out duties properly, and in general cases for day-to-day routines necessary to ensure that men, material and equipment are functioning properly towards the desired end. Administration concerns with planning, organising, staffing, direction, coordinating, reporting and budgeting.

6.1 Role of Library Committee

The Library committee plays important role in library management. It advises the top management on all or some of the following aspects:

(i) Library building;
(ii) Library furniture and equipment;
(iii) Library staff;
(iv) Library finances;
(v) Book collection;
(vi) Library rules;
(vii) Library services; and
(viii) Library policies.

The Library Committee may consist of members representing different interests/activities of the parent organisation, with the Librarian as the Ex-officio Secretary. The Committee is responsible for policy making and the Librarian is to implement this policy by working out details which should be within the framework of the general policy laid down by the Library Committee.

7. MANAGEMENT CONTROLLING

Controlling is a managerial necessity. It is an important activity to detect and correct significant variations in the results obtained from planned activities. Controlling consists of a process made up of the following steps:

(i) Measuring the performance;
(ii) Comparing the performance with the standard and ascertaining the differences, if any; and
(iii) Correcting unfavourable deviation by means of remedial action.

7.1 Assessment of Performance: User's Satisfaction Ratio

Of special importance in controlling is the feedback which may be in the form of statistics on reports compiled by the library staff about their work output. Feedback plays an important part for assessing performance in reader's services. It may be measured as Users' Satisfaction Ratio, for example

$$\frac{\text{Number of titles supplied}}{\text{Number of titles demanded}}$$

or

$$\frac{\text{Number of reference queries satisfactorily answered}}{\text{Number of reference queries received}}$$

8. MOTIVATION

Motivation is the desire within an individual that stimulates him or her to action. The factors affecting motivation are (i) personal wants and needs, (ii) goals and perceptions of the person or the group, and (iii) the manner in which these needs and goals are to be realised. Motivation is key to work performance. Librarian has to essure that his staff is properly motivated to give optimum output and performance. In this context, contributions of Dr SR ranganathan in inspiring the whole generation of librarians and motivating them to provide quality services to the users are noteworthy.

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INFORMATION TECHNOLOGIES FOR LIBRARIES AND INFORMATION CENTRES

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Defence Scientific Information and Documentation Centre, Delhi-110 054

ABSTRACT

For the past few years, the tremendous strides taken in the fields of information technologies have changed the society into an information conscious society. There is little doubt that the impact of these technologies on the day-to-day functions of information centres is an everlasting one. The innumerable advances in different fields such as computers, communi- cations, electronic mail, voice mail, teletext, videotext, telefax, videodisc, CD-ROM, electronic publishing, etc have left no area in the library and information field immune for their application. And many areas still remain undiscovered.

This paper, first in a series, makes an attempt to overview the impact of the information technologies on the library and information services. A brief discussion of electronic message and documentdelivery systems,and electronic mail are also presented.

1. INTRODUCTION

Information is becoming one of the major resources on which our information society is based. Technology is the means by which this resource is stored, retrieved, and transmitted to the users in the form and at the location of their choice. Much of our attention is centred on the ways and means by which the above activities are best achieved.

Now a days, information centres are facing multiple problems. The number of documents published in any subject field is so vast that the libraries cannot think of acquiring comprehensive collections in any field. The ever shrinking library budgets cannot help in acquiring balanced collections to satisfy the needs of its clientele. And the escalating prices of books and serials cannot keep libraries to maintain status quo in journal subscriptions and document acquisitions. This situation changed the basic norm of the libraries, from acquiring comprehensive collections to providing comprehensive access to information. To achieve the comprehensive access to information, libraries have to use various technologies and services.

Any information service will deal with the aspects of acquisition, storage, analysis, retrieval and dissemination of information to the users for whom the service is intended. The technologies which improve the efficiency and effectiveness are taken as inputs into the information system. These input technologies have been increasing in number and are known by the generic term 'information technologies' (ITs). Some of these are available for libraries for many years, while a few are now emerging as important tools of overcoming the barriers in the access of information. An appropriate mix of ITs and applications provide a competitive edge and ensure a timely and efficient dissemination of information.

The changes which resulted in the need forimproving the information services are [1]:

(a) The number of users of information is ever increasing and is hence becoming difficult to have informal, personal communication;

(b) The geographic distances involved in certain routines of information acquisition are too large. Though technology developments in other fields such as aeronautics, etc. has made the world closer, the huge prices involved in the acquisition of information by such means made it impossible. This has led to innovations in telecommunication fields;

c) The urge to use modern developments in the related fields of electronics, computers, and telecommunications;

d) The increasing role of information in shaping the economy of a society. This stems from the development that the countries which produce more information have an edge over others because of the use of that information results in technological developments and the dissemination brings in financial resources in foreign exchange; and

e) The changing notion of the information from *something to know* to *something to have* as any other commodity.

And unlike other commodities which can e exhausted by usage, information as a ommodity is not depleted by use, rather the sage incre- ments it; not lost by sharing, and s indivisible and accumulative. It has an portant property of self-multiplication.

.1 What is Information Technology?

Broadly speaking, the elecommunications and computers constitute he major part of the information technology. While the latter's penetration is more in ouse-keeping, information processing, etrieval and dissemination, the former's enetration is in accessing the emotely-located databases. Perhaps there is o other technology which has penetrated ibraries so much. The technology of formation comprises a vast range of rocesses for storing information and uplicating it, for transmitting it from one place o another, for displaying it and for transforming t. The effects of the ever increasing usage of IT are felt in every day life, including home.

The first information revolution brought the written language for communication, the second came from the day printing and printed book came into vogue. Now computer and telecommunication technologies have brought the third information revolution, the effects of which, in terms of information, are far reaching.

In the present day society, information plays a dominant role. It has become a *commodity* in the industrialised countries. The contribution of information industry to the GNP has been ever increasing in the developed and industrialised countries. It was reported by Eileen Shanahan back in October 1985 in *New York Times* that over 70 per cent of work force of the United States are involved in organisations directly producing information-based services. It also reported that for every US $ earned, 50 cents are coming from an information-related activity. It was stated [2] that sales in the overall online market (which is only a part of the information industry) look good and is expected to reach US$ 9.9 billion by 1990 showing an actual increase of 15.8 per cent in 1985 with an increase of 36 per cent over 1984 revenues.

It is estimated [3] that six per cent of the GDP of the European Community (EC) is produced by IT core industries such as computers and peripherals, computer services, software and components. A further 29 per cent GDP is produced by industries which are highly dependent upon IT including telecommunications, office and factory automation, consumer products, banking and insurance, and defence applications. A further 20 per cent GDP is derived from activities highly dependent upon efficient information systems supported by IT including wholesaling and retailing, CAD, CAM, quality control, etc. Consequently some 55 per cent of the EC's GDP is directly or indirectly dependent upon IT including telecommunications.

The number of the sectors supplying inputs to IT, telecommmunication components, systems and subsystems are large. There is no doubt that the information industry is theworld's fastest growing sector which includes computers, software, databases, compact and videodiscs, communication equipment and a large number of the electronic gadgetry as well as the traditional printed media. Application of IT in information centres raises the efficiency of information acquisition, handling and use, and thereby assist us in being better informed about our relative economic performance.

Lancaster [4] is one of the few who foresaw a paperless information society. In his words, the society finds itself in the early stages of natural evolution from print-on-paper type communication to an electronic media type communication. In another context he reported [5] that by the year 2000, 50 per cent of the existing abstracting services will be available only in electronic form, while 25 per cent of the existing periodicals in science and technology, social sciences and the humanities will not reach this conversion level until after 2000. 25 per cent of the reference books will be in electronic form by 1990.

If the current trends in CD-ROM technology is any indication, there is no doubt that the above prophesy will become a reality in a very short time. In the times to come, more emphasis will probably be on non-print or audio-visual products such as microforms, videodiscs, videotex and teletext. As technology changes library activities too are certainly bound to change. This paper aims at overviewing the different technologies that penetrated the libraries and their impact on the information services. However, as the impact of computers is well known, this was not included in this review.

1.2 Electronic Library

An electronic library is one which provides a widest possible access to information by making use of the latest information technologies for retrieving information, to increase and manage its information resources; and is equipped with a communication network for retrieving information that is not available locally. The main stress of an electronic library will be on the ability to enhance resources, speed of retrieval and communication of information; and usage of the ITs for timeliness of its information services, probably more cheaply than what we have been doing.

2. COMPUTER-BASED ELECTRONIC MESSAGE SYSTEMS

Computers are becoming common tools in many sectors of the society. The technological developments in the fields of computers and communications over the past three decades have led to a tremendous change in the electronic interchange of information between two points even if they are located in different continents.

A computer-based message system (CBMS) allows communication between people using computers. A message, or a unit of communication, is sent by its originator to one or more recipients [6].

CBMS can be used for communication between person-to- person, human-to-machine and machine-to-machine. DARPA Internet, CSNET, MLNET MZnet,and Diamond are examples of networks which use CBMS. A document or message sent through electronic systems may contain text, graphics, images, speech as well as other types of information such as electronic spread-sheets. A computer-based system used for sending a message or document may have such facilities as creating, editing, filing, receiving, transmitting and printing of the multimedia documents, all elecronically. CBMS can be classified as shown in Fig. 1.

ISO (International Standards Organisation), EMCA (Electronic Mail Corporation of America), and CCITT (International Consultative Committee for Telephony and Telegraphy), etc. have

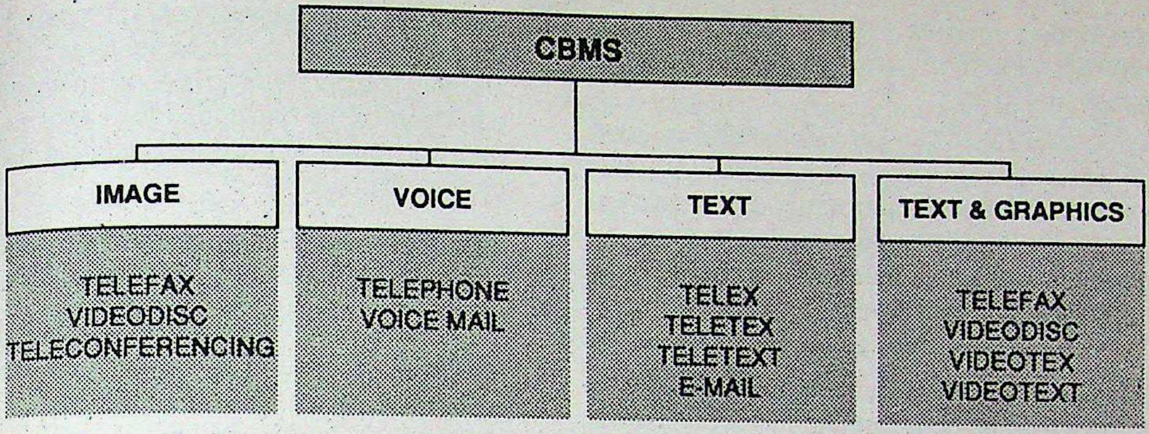
CBMS
IMAGE
TELEFAX
VIDEODISC
TELECONFERENCING
VOICE
TELEPHONE
VOICE MAIL
TEXT
TELEX
TELETEX
TELETEXT
E-MAIL
TEXT & GRAPHICS
TELEFAX
VIDEODISC
VIDEOTEX
VIDEOTEXT

Figure 1: **Classification of computer-based message systems**

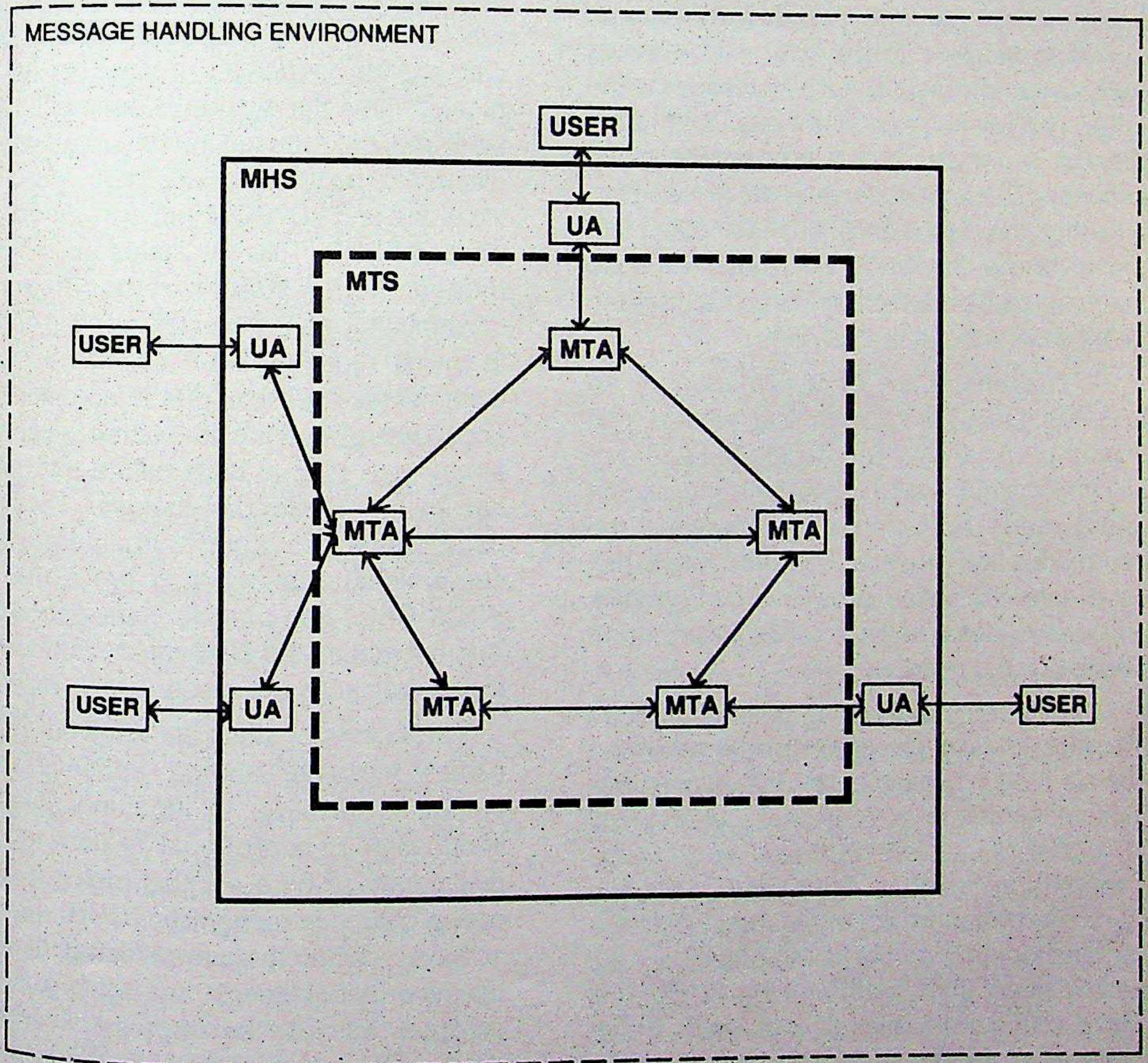
MESSAGE HANDLING ENVIRONMENT
USER
MHS
UA
MTS
USER
UA
MTA
MTA
MTA
USER
UA
MTA
MTA
UA
USER

Figure 2: **Electronic message handling and interchange model (CCITT)**

developed models for electronic message handling and interchange. CCITT's model is shown in Fig. 2.

The CCITT recommendations on MHS [7] cover a wide range of subjects including service elements, protocols for message transfer, service facilities available to users, presentation, type conversion, teletex access, open system interconnection, etc.

An electronic message handling system (MHS) is a complex system comprising a message transfer system (MTS) which itself is a network of message transfer agents (MTA) and is aided by an intermediary, called user agent (UA). UA has two functions, viz. providing facilities to the user and allowing reception and transmission of messages to the MTA. The user can access the MHS through the UA to which commands can be given according to the need to send the message to a destination. The message is then passed to the MTS via the MTA associated with the user/intermediary which ultimately reaches the destination through the network.

Dissemination of information in an accurate, timely and economical manner is an important factor that can decide the future of any information system. Electronic messaging offers many advantages in improving the information flow process. The information may be orders for online acquisitions, invoicing, numerical data or any other information needed by the user.

Electronic messaging does not require the information provider (originator) and seeker (user) available at the same time. Systems using mailbox can offer a wide variety of options which include receiving, transmitting, sorting, filing and retrieving stored information when needed. Different persons working on the same project spread over a large area, and working in different hours can communicate with each other. Electronic transfer of information decreases preparation and delivery costs compared to the traditional services such as telex, letter or courier. The person who is sending information can transmit the message faster avoiding a lot of intermediary routines associated with traditional services.

3. ELECTRONIC DOCUMENT DELIVERY SYSTEMS

One of the important functions of an information system is to provide material requested by its users. When the required material is not available in-house, the system may try to obtain the material from other libraries or a documentsupply centre (DSC). Electronic document delivery system (EDDS) can provide immediate access to the user provided that the system is connected to the DSC and the required information is stored in electronic media. Magnetic tape, video tape, videodisc and CD- ROM, etc. can effectively be used in EDDS. This eliminates the inordinate delays in the supply of documents by conventional means, including online ordering. In online ordering, even when the required document is available, due to communication shortcomings and the time taken in supplying, it may take several days before the required document is received by the user. Though this can reduce the delay considerably over conventional ordering, it is not a match for EDDS which can provide immediate access. Another feature of EDDS, apart from speed, is the convenience in access.

Four major steps are involved in EDDS, namely inputting, storage, transmission and output or delivery. In inputting stage, the information in print media is converted into digital form using a suitable method such as optical character recognition (OCR) devices or scanners. When the information is already in machine-readable form, through a conversion program, this can be digitised. For storage there are three main media, viz. magnetic tape, video tape and digital optical disc. Transmission of information is achieved by several means. Telefax or facsimile transmission can be used to transmit both textual and graphical material over telecommunication links. But satellites can offer a better transmission than elephone lines (for a comprehensive reatment of the subject see [8]). The output an be chosen in one of the three forms, amely, hardcopy, microform or alternately isplay on a TV screen or a VDU.

The following factors influenced to the stablishment of many projects on EDDS.

- The need for a rapid, reliable delivery of high quality primary information;
- The latest developments in the technology of information capturing, storing, transmission and display;
- The development of optical discs as an alternate medium of printed publications;
- The support given by inter-governmental agencies like the European Commission and the consortia like that of ADONIS; and
- The success, growth and popularity of online bibliographical retrieval services.

The Commission for European ommunities (CEC) in 1979 has ommissioned, a large American Consulting rm to undertake a feasibility study on arge-scale document delivery system. As a esult, ARTEMIS (Automated Retrieval of Text rom Europe's Multinational Information ervice), an open-ended network of computers nd communication links through which a umber of documentation centres could rovide full-text on demand either in facsimile digitised form was conceived. There have een a number of other projects and schemes r electronic transmission of documents. ERMES, which is basically a telex system ponsored by British National Physical aboratory, Department of Trade and dustry and Printing Industry Research sociation, UK, (1981); APOLLO (Article Procurement with Online Local Ordering), a joint project of CEC and European Space Agency (1981), the British Library Facsimile Transmission Project, launched by the R&D Division of the British Library (1984), Transdoc, a French Consortium (1982), Fiz4 of West Germany (1982) and the Eurodocdel, a joint venture of Europe Data (of ELsevier) and CII Honey Well Bull of France, are a few to mention.

Specific mention is to be made here of the ADONIS (Advanced Document Over Network Information Services) project which is a Consortium of major European Publishers including Blackwell, Springer-Verlag, Pergamon, Elsevier, Academic and Wiley. The Consortium has undertaken discussions in Europe, USA, Japan and other governmental agencies and publishers, and document supply centres like BLDSC with a view to set up a world-wide electronic document supply system. ADONIS aims to supply articles on demand from a database of about 5000 important journals supplemented by a five-year back-file provided by 200 publishers. The journals will be stored on optical videodiscs from original printed versions and transmitted to local centres where they will be printed and supplied for a fee [9]. Useful features of the system include

* dissemination of contents lists of S&T periodi- cals, books, monographs, etc;
* full-text of patents, standards, articles required;
* availability of a comprehensive range of documents from a single source;
* easy online document ordering and delivery;
* automatic document delivery ofpre-specified documents, such as documents on standing order, on regular basis;
* lists of current periodicals; and
* SDI.

The low level usage of EDDS, as of now, can be attributed to the high cost factor (compared to conventional services) and the not-so wider acceptance of the technology by the developing countries. It also needs deposit accounts to be maintained with the DSCs in advance, which means further cutting in the already dwindling library resources. The wide range of equipment and systems needed to establish the service initially are expensive and causes a frowning attitude in the library authorities. It can be seen that the majority of the users still wish to use traditional means to order and receive a document in need. Because the user has very simple need to be satisfied, a service that can supply needful documents in a reasonable time, say a week or ten days, reliably and that too at a price his library or the user himself can afford to pay. Ther are some doubts about the long time effects of the EDDS on the traditionally printed journals. But at a time when the publication of printed journal becomes totally uneconomical due to the rising costs of input materials, processes and the ever diminishing subscriptions, publishing from totally electronic data on demand could become common. Usage of the broadcasting satellites would greatly enhance the quality of such systems and reduce the costs also. EDDS is a conglomeration of new technologies. A few of them are briefly discussed in the following pages.

4. ELECTRONIC MAIL

Electronic mail (E-mail) is a computer-based EDDS, used to create and transmit messages electronically addressed to an individual or a specified group of individuals. With its origin in 1960s, it became an important means of sending information via a computer-based network between addressed computer workstations. Like facsimile, telex and other message systems, E-mail systems allow people to send messages to each other electronically. This can be taken as an extension of the traditional telex service with an exception that the sending and receiving points are not centralised as in the case of Telex Office [10]. Here any computer can communicate with a host computer. To send the mail, the user needs a modem to convert the computer signals into a form suitable for transmission and vice versa.

Based on the target group, E-mail can be conveniently grouped into four, viz. one-to-one, one-to-many, many-to-one, and many-to-many. One-to-one mode is the most common of all and is useful to send communications from one user to any other user. In one-to-many, the mail is directed to many users, while many-to- one is exactly the opposite of this mode. Many-to-many is a mode which enables 'posting' a communication publicly, where others can read and leave their comments to be read by many. Buckland [11] discussed the applications of these four modes as 'notes, broadcasts, comments, and bulletin boards'. Computer conferencing can be taken as a form of the fourth group.

The E-mail would look after the messages until the user wishes to access them at the time and place of his or her choice. A mailbox can sort the mail into different categories, inform the urgent matters which needs immediate attention, help in dealing with messages, take care of filing, searching and retrieving of messages upon request, thus virtually becoming a sort of personal assistant. When individual codes, possibly with encryption or passwords are assigned, users could log-on from different locations while in trip, at any time of the day and send messages to others or retrieve messages accumulated since the previous log-on.

Another advantage of the E-mail is that the distribution lists can be stored in the system, which aids in selecting the recipients to receive a particular information or message and transmits simultaneously to all the recipients.

E-mail is primarily used at present for informal communications between people separated by geographical distance and time zone differences. This benefits the individuals by saving time, reducing interruptions and improving communications. However these benefits are intangible, difficult to measure and do not make a direct impact on the profitability of an organisation.

Three important benificial characters of E-mail are the speed and reliability of delivery and security and privacy of messages [12]. The potential uses include general correspondence, exchange of documents, teleconferencing, announcements, etc. On the library side, E-mail is being used heavily for transmitting interlibrary loan requests and document purchase orders. OCLC has a subsystem (OCLC ILL) connecting some 700 libraries which is a dedicated inter library loan system. Of late, library professionals have also begun to use E-mail for communications among officers of professional associations. E-mail can also be used for reference queries that could range from ready reference-type to problem solving questions in the areas of cataloguing or MARC formats which can be greatly expedited by the use of E-mail. A record of the responses can also be kept. Both the sender and recipient can initiate the message or pick up the message when it is convenient for them. This applications list is by no means exhaustive. Many uses remain undiscovered.

The E-mail is much cheaper than conventional telex for sending messages to outstations. Combined with its easy readability due to the mixed letter base (upper/lower case), which is not available in telex, it is a viable alternative to telex for institutions for international communications. The communication is faster through E-mail than telex or cable.

Many E-mail networks of universities, commercial agencies, etc are interconnected through major networks such as USENET, INTERNET and BITNET, which in turn are interconnected through gateway machines. This interconnection between commercial networks are non-existant until recently. It is possible to send messages, documents from one network to another only when they are interconnected by means of gateways. Conformity of protocols, etc with the CCITT X.400 standard will allow the interconnectivity of different networks with each other. In this environment one can send mail to anyone having mailbox in any other system because of their connections to diverse communication media. Some E-mail systems have sophisticated features which make them extremely useful. E-mail can be sent to even fax machines, [13] telex printers and remote printers. AT&T Mail is an example of such an advanced features system.

Document supply centres like NTIS, University Microfilm International Article Clearinghouse and British Library Document Supply Centre (BLDSC) have E-mail addresses, and accept orders through E-mail, thus speeding and facilitating the delivery of required documents. This feature is also available with most of the online search services such as DIALMAIL of DIALOG, EasyPlex and InfoPlex of CompuServe network, and public packet-switched networks. These can forward the retrieved citations by E-mail to a DSC of the searcher's choice.

Systems with E-mail features OnTyme II, designed and marketed for library community, include JANET (Joint Academic Network), Envoy Post of Canada Telecom, Postcorp, E-COM (Electronic Computer Originated Mail) of EMCA (USA), DMAIL of Delphi, MCI Mail, ALANET of the American Library Association, Telemail, Easylink, etc.

Facilities provided by E-mail systems are categorised as follows [14]:

Message Preparation: Word processing, note book facilities, annotation of messages received prior to forwarding or filing.

Message Transmission: Timed delivery, directory services, multiple addressing, distribution lists, abbreviated addressing, message priorities, automatic route selection, message transfer information, links to other networks.

Message Receipt: Mail scanning, selection replying, forwarding, rerouting, filtering of messages, and notification of new messages.

Security and Reliability: System security, protection against message lost, encryption, security software and inhibiting hard copy.

Message Filing and Retrieval: Storage capacity, retrieval and archival facilities.

Message Logging: Accounting and management reports.

One main disadvantage of E-mail is that the current systems normally allow foles of more than 100Kbytes, whereas document files may be of the order of several megabytes. Bill Tuck has compared [15] the cost of sending a megabyte file over Telecom Gold of the British Telecom (80 pounds in peak time and 20 in off-peak time) and Integrated Digital Access also available through British Telecom (13p or 4.4p!). Other factors include the ongoing high cost involved in the usage of E-mail, equipment and service overhead costs. Set up costs of E-mail services can include training, documentation, monthly minimums of usage and telecommunications cost [16]. Inspite of these factors, E-mail is widely recognised as a convenient and cost-effective means of communication.

The main difference between E-mail and teletex (or telefax) is that in the case of E-mail, messages can be held in the memory of the sender's computer and transferred to receiving computers (as per the E-mail addresses). The received messages can be stored till they are retrieved by the recipient. In the teletex (or telefax) transmission is instantaneous and no intermediary storage is possible as these operate on point-to-point mode (i.e., from sending terminal to receiving terminal).

4.1 Electronic (Online) Ordering

To avoid delays taking place in the conventional ordering, many document supply centres (for example, BLDSC) and information retrieval services such as DIALOG and CAS have been offering electronic ordering facility for the users. BLDSC is accepting document supply requests over telex for quite sometime now, and has been offering online ordering facility called ADRS since 1981. This still did not get full acceptance of the users as the requests are not growing at any significant rate. The prerequisite in this type of service is that the customer has to have an account with the DSC. The dial-order services ofCAS introduced in 1982 has evoked good response with nearly 25,000 requests in the first months by more than 1,300 subscribers. Many prefer to use conventional post for ordering. Information retrieval services such as DIALOG and those linked with E-mail systems and many major publishers and book vendors are accepting dial-order services or entertain electronic ordering (for example, Baker & Taylor, Ingram in USA). Many also maintain mail- boxes with E-mail systems like DIALMAIL, ALANET, etc where possible, the requested document can also be delivered via an EDDS.

4.2 Voice Mail

This is the most sophisticated type of the E-mail.This does not require anyone to type or input a message to be sent. The recipient of the communication is to be named first and the message is dictated. The system transmits the message by digitising the analog voice signals. At the receiver's end, the message is reconstructed.

In a voice mail system, the computer records the message, stores and then delivers the message as and when called for. Modems are used to convert the binary signal into an ac signal for transmission and the transmitted ac signal into binary signal upon receipt.

There are two methods of voice digitisation [17]. In the first method, speech can be digitised by vocoders. The vocoders analyse the pitch of the voice and vocoder filters divide the signal into different frequency ranges. The advantages of the system include the use of the transmission lines to a maximum efficiency, error control and correction, and data encryption. This is more compact than the analog speech on a voice-grade line and uses the transmission medium to a lesser extent.

Second method is the waveform analysis. Here voice digitisation depends on the software used for digitisation. Pulse code modulation is a type of waveform analysis. The main advantage of this is its lower cost.

Voice mail system can do most of the things that an E-mail system does, i.e., messages can be read, printed, answered, filed, etc. Image mail system, where one can see the picture of the message sender actually speaking, is too expensive and luxury. As all these technologies have common basic features, image, voice and text may converge in the future to give a comprehensive E-mail system.

5. CONCLUSION

The impact of the information technologies has already been felt by the library community. Quite a few number of libraries already are using the new technologies in many fields. Use of computers in house keeping process has been on the increase. So is the access to online databases through gateway packet- switching networks and DIALOG etc, and the transmission of important and urgent documents through telefacsimile. Thanks to the breakthroughs and developments in electronics and related fields, the cost of these technologies is within the reach and these technologies which were looked upon as'elitist' a decade ago are finding their wide acceptance and usage in many libraries. Though electronic mail is a late comer to India, already a few centres have the facility (for example, DESIDOC and INSDOC) to serve the users in an efficient way. E-mail will greatly improve the information delivery, particularly for document supply centres. The convergence of online information retrieval and E-mail (as is evident from the addiition of E-mail features to the major online information retrieval systems),have already proven their acceptance. It is also envisaged that the E-mail networks would provide access to online information shortly. It is time for adopting ourselves to the 'order of information society' which has great potential to enhance the economical growth of the nation.

ACKNOWLEDGEMENTS

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Whatever Nature has in store for mankind, unpleasant as it may be, men must accept, for ignorance is never better than knowledge.

—Enrico Fermi

DEVELOPMENT OF EXPERT SYSTEMS FOR INFORMATION RETRIEVAL : AN INTRODUCTION

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1. INFORMATION RETRIEVAL

Information retrieval systems comprise of databases and software for interactive searching. The searcher makes a set of primary decisions derived out of his own knowledge about the database and creates a set of commands to the computer instructing it to perform different functions. This process becomes more complex when the searcher has to deal with a variety of databases on a variety of subjects. Also there will be simiar searches conducted by different people and the strategy which will have a direct impact on the result, differs from person to person. It is possible for the searcher to try a trial and error method if the searcher is working on an in-house database or a CD-ROM-based database system. But it is impossible for any organisation to develop and maintain all the data relevant for their purpose in a single database nor is it possible for the organisation to develop a series of databases. Also the value of information depends on the time frame which is made available. This makes it very important for the users to access online hosts, but it is difficult for any searcher to gain knowledge about all the online database hosts available and also on all the databases. This problem becomes more complex when the search is conducted by a group of people. So it becomes absolutely essential to have a knowledge-based system that helps the new searcher to structure his or her query based on the database specialisation and previous search experience.

2. KNOWLEDGE COMPUTERISATION

Knowledge, the totality of the ideas conceived by the human civilisation, is one of the modern arenas of computerisation. The concept has developed from database to knowledge-base. The knowledge which has attempted for computerisation is the justified true belief of the human society. Since the computer systems are unable to judge on the quality aspects of 'true' beliefs, it was always a mind-boggling problem for the knowledge engineers to define precisely the true knowledge. Because of this, they have shifted to asserted knowledge which are derived from hypotheses or rules and facts. These are either derived or observed facts. Hypotheses are at times referred to as interference rules and express the knowledge resources built into the system. There are two kinds of hypotheses. One that describes change—transformational, and the other describing the structural. For example, the knowledge that journals on cancer contain different information on different aspects of cancer enable us to look for more information required on cancer in these journals. The information contained in the journal is transformational or it is introduced into the journal. This fact enables us to derive at the conclusion that the information on cancer can be got from the journals on cancer. This knowing also includes hypothesis about what can be provided as an infinite source of derivable facts. It is the identification of how these rules are applied within an accepted mode of reasoning that forms the inference (basis for explanation).

3. HEURISTICS

The knowledge of what and how to apply these rules is referred to as 'heuristics'.

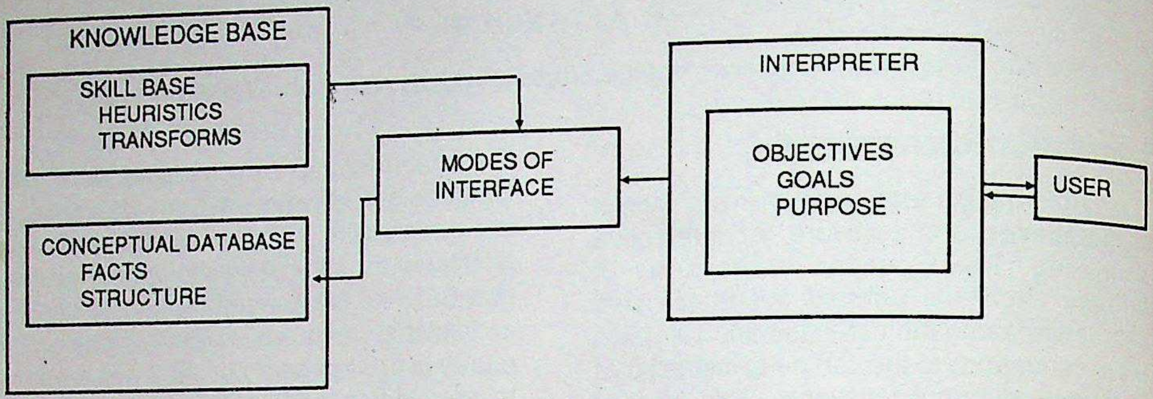

Figure 1. **Basic components of an expert system.**

Heuristics control the reasoning. The computer systems that are organised explicitly and distinctly to represent facts, inferential knowledge and methods of deduction are referred to as 'expert systems'. Expert systems are normally presumed to capture the essential competence of an expert. Competence consists of that knowledge about the task environment modelled by structural hypotheses and facts; and skilled to perform the task modelled by transformational hypotheses and heuristics.

Figure 1 shows that the knowledge system is dependent on the knowledge-base and the interpreter. The interpreter acts as an interface between the system and the user. The interpreter is generally concerned with the setting up of goals for the system and achieve appropriate results for the user.

4. CONCEPTUAL DESIGN

One of the problems of designing a knowledge-based system is that the nature of knowledge does not fit well into any acceptable theoretical format. The attempt to discover a set of finite units and a set of loss of behaviour that allows the construction of the model proves to be difficult. One of the aspects that is attempted in the designing of a knowledge-based system is theory of information, consultation and representation. In this theory, knowledge is identified in the form of units. Each unit will have a central element called the entity. The units will also have the properties of the entities, the action by or on the entity and its qualifiers. The heuristics are developed based on the organisation of these units. For developing the system, the relational analysis can be followed and is applied. The database will be developed on the entities with their properties, action and qualifiers, and their relation is established. The data storage will be a common pool. The relations are established based on the well formulated principles on which the file design will be based. Once the relations are established, the conceptual model of the database is evolved. This involves:

(a) Removing repeating groups and establishing identifying attributes for entities;

(b) Investigting functional dependencies on identifiers;

(c) Investigating functional dependencies on the properties and actions;

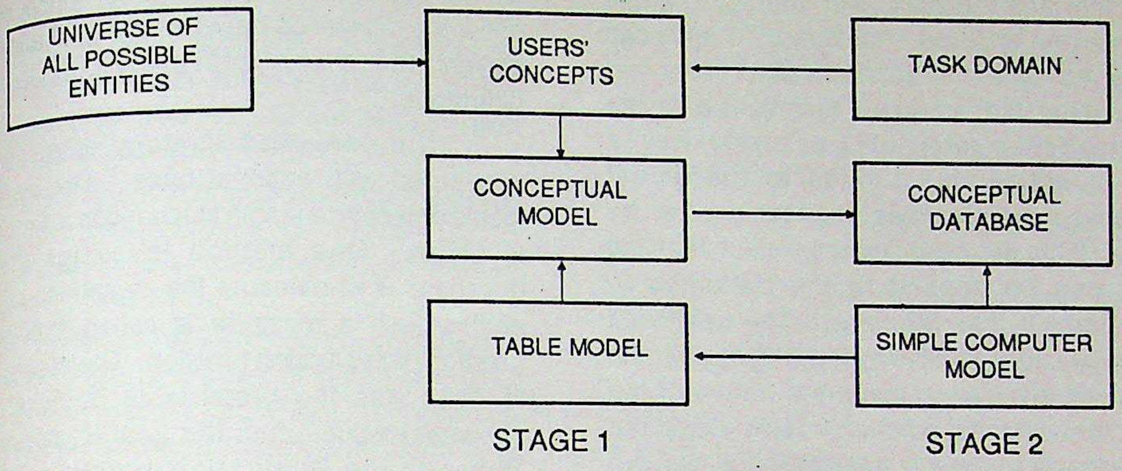

Figure 2. **Engineering a knowledge-based system.**

(d) Drawing relationships between entity sets;

(e) Expanding the entities with properties, actions and qualifiers;

(f) Creating new entity sets to reduce many-to-many relationships to one-to-many relationships;

(g) Replacing by establishing one-to-many relationships with zero implies or one implies. This requires further interrogation of the entity and the examination of the environmental data to fix the mapping component;

(h) Joining the dependent entities;

(i) Considering the entity restrictions (for example, if there is an entity set which depicts the relation between a parent and a child, the the parent cannot be his or her own child); and

(j) Determining partitions to make the definition more concise and to make entities and its associateship concepts.

Figure 2 illustrates the stages in engineering and knowledge-based systems.

This is a generalisation of a simple computer model. The construction of the conceptual database is also determined by the type of machine architecture employed and its realisation. Studies have shown that computer system designs, to serve a purpose within an organisation, are subject to recurrent re-specifications. These re-specifications are needed because the initial requirements are not properly identified and because of the normal development experienced by any organisation. This results in frequent modifications to the programmes and file structures which results in the deterioration of performance and increase in errors. It is also understood that about 30 per cent of the major programme codes lies idle because it cannot logically be entered from any normal routines, after the revisions are done. This happens to the knowledge-based system also unless this aspect is taken care of during the time of designing.

5. PRODUCTION ASPECTS

As mentioned earlier, the knowledge-based system is formed from the database, production rules and the controlled strategy. The database represents the entities or the problem state. The heuristics or the transformational rules express how the database may change to conform with the problem and the controlled strategy decides from all the applicable solutions. All rules can have access to the database at all times, but they must not act upon themselves or the controlled strategy. Each rule has a pre-condition that relates to the global database and describes when the rule can be used. If the pre-condition is satisfied, then the rule can be applied to the database to transform it into solutions. The controlled strategy chooses rules by drawing upon some heuristic knowledge about the nature of the problem and its solution. This does not necessarily mean any analytic foundation but depends upon a deeper understanding of the problem, than what is apparent from the representation of it. This is achieved by the interaction with the user, who poses the problem. The production rules are a set of transformations in two parts. A conceptual part that expresses when the rule can be used and the transformational part that shows when the rule is applied. Some rules are obligatory and must be applied when the conceptual part matches the situation. Other rules are optional and open to selection by the controlled strategy. The title problem may be defined by expressing the constraints as a series of rules which are interpreted as, IF A SITUATION, THEN APPLY A TRANSFORMATION. All mandatory rules must be applied since they govern the constraints of the system. The optional rules can be selected since they describe the choice of the transformation towards a given solution. These rules are also called negative feedback rules, since they show the difference between the goal and the current state, then react in a way to reduce the difference.

The controlled strategy is primarily concerned with optional rules. The system would enter into a stable loop unless a direction is given. One method to assign these directions is to measure the closeness to the goal. Such a measure is called state-goal function or evaluation function. The state-goal function has the property of being at its maximum value when the goal is achieved, whereas the evaluation function is an assignment of the cause of achieving the goal. Figure 3 shows the classes of controlled strategies that can be used.

Irrevocable strategies are the ones that can be used to choose the rules and apply it and once the transformation has been done it is never reversed. Such a strategy can only be used provided that one is very sure of the solution. The tentative strategy provides an opportunity of exploring the problem space and to determine the solution from experience. The backtracking is one of the common forms of tentative strategy. The backtracking conditions may be that

(a) The same state of global database has appeared in its solution path as has appeared earlier. This means that the path has doubled back on itself and therefore another choice is needed;

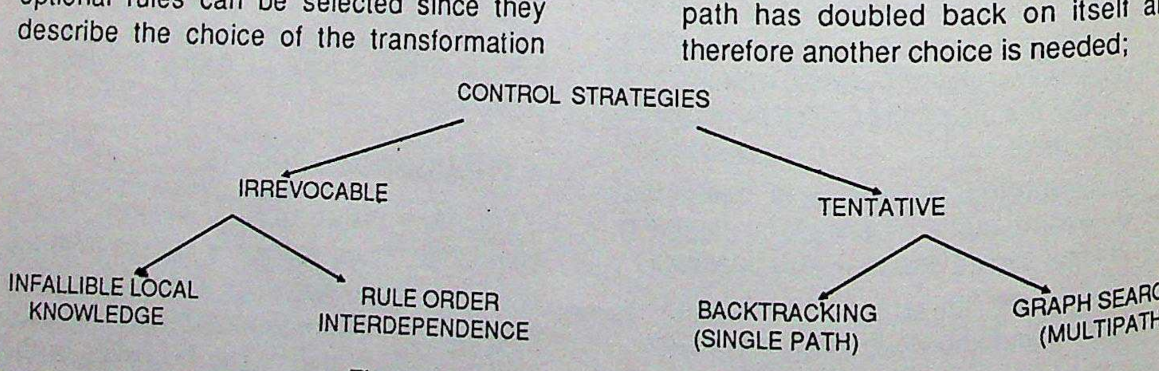
CONTROL STRATEGIES
IRREVOCABLE
TENTATIVE
INFALLIBLE LOCAL KNOWLEDGE
RULE ORDER INTERDEPENDENCE
BACKTRACKING (SINGLE PATH)
GRAPH SEARCH (MULTIPATH)

Figure 3. **Types of control strategies.**

(b) The path travelled has gone beyond certain proof methods (depth bound). This embodies some knowledge of the expected size of the solution beyond which it is not reasonable to go;

(c) There are no more optional rules to apply and, therefore, it is necessary to backtrack to an earlier state where there was a choice;

d) One of the problems of backtracking is that it has a danger of going in cycles without reaching anywhere. Though to an extent these cycles can be avoided by a depth bound search, it is always better to use graph search to explore many of these simultaneously; and

e) In graph search, a problem space is repeated as a directed graph where each node is a particular state of the global database, and each entity of the database or a group of entities with similar characteristics forms a node.

APPLICATIONS

There is a lot of work done to create nowledge-based systems in the field of library nd information science. Following are some the examples of the application of expert stems for information retrieval:

a) One of the earlier attempts made was to search the databases using the logic of associations. Here the association between scientific concepts in the inter-disciplinary research fields is translated into word maps, graphic representations of logical processes on which the research is based. This opened up new possibilities for searching.

) Courtial and others have discussed about a system called LEXIMAPPE graphs and logic of associations on which they are based.

) Plexus was another expert system design for computerised information system in public libraries. The system was developed at the London University Central Information Services.

(d) The National Library of Medicine has developed a patent information system for searching online patent databases.

Attempts were also made for developing intelligent interfaces for online searching and systems like Easynet, though not completely knowledge-based ones have evolved. The objective of all these systems were to reduce the drudgery of searching for information and provide the most relevant information through interactions with the actual user.

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Intelligence is that faculty of mind, by which order is percieved in a situation previously considered disordered.

—HA Fatmi & RW Young

INFORMATION NEEDS OF RESEARCH SCIENTISTS

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ABSTRACT

For the effective management of library and information centre and to provide pinpointed information service to the library clientele, an essential pre-requesite is to conduct user study. The present study is a modest attempt to survey the information needs of Indian R&D scientists.

1. INTRODUCTION

Scientists often find themselves in situations where they must make a decision, answer a question, locate a fact, solve a problem, or understand something. In attempting to meet these needs, scientists use, both formally and informally, a variety of information sources (for example, libraries, individuals, computer databases), via a variety of methods (for example, phone, letter, face-to-face contact), and in a variety of languages.

2. REVIEW OF EXISTING LITERATURE

User studies originated with the perception that by understanding users and their information needs one could design an effective information system. Although many reviewers did question the validity of user studies as guides to improving information services, studies in the subject continued to grow in numbers. A number of reviews and bibliographies cover user studies conducted [1-8] prior to 1966.

Crawford [9] estimated that 1000 user studies had been published. An online search for this work using terms such as user needs, user satisfaction and user studies turned up 2000 documents in one database alone. The literature on user studies in the field of science is composed of a large body of data that cannot be correlated, due to differing objectives, methodologies, scales and definitions used in the studies. Each study stands in isolation, with no obvious links that enable it to be compared with other studies.

The topic of information needs and use has been discussed in India from 1962 onwards. 'Users and library and information service' formed one of the topics at the Second IASLIC Seminar [10] held in 1962. This was followed byDr SR Ranganathan's annotation [11] on users' surveys. From 1968 onwards, users and their problems in different fields of science and technology (S&T) began to be considered for study and analysis. Exhaustive surveys have been conducted in the areas of electronics [12], chemistry [13], physics [14], food science and technology [15], electrical engineering [16] and again food sciences [17]. Studies in chemistry and electronics were carried out in the late sixties and some of the finding may not be relevant today.

Until now, the strongest complaint against user studies has been the use of defective methodology. Menzel [18] and Herner and Herner [19], have expressed concern over the field's failure to adopt sound methods of its own. Inconclusive studies are conducted to fill gaps left by previous inconclusive studies.

Information needs have been studied using methods developed for studies in the social sciences. Basically there are three main methods of collecting data either explicitly or implicitly related to users' information needs: viz., questioning, observation, and analysis of documentary sources [20]. The most commonly used ones are the survey techniques of questionnaires and face-to-face or telephone interviews [5,8,9,21-23] because they provide the most easily quantifiable data. Among the other methods used are those based on observation, experiments, simulations, and analysis of various records or documents, such as circulation records, statistical records, diaries, solution development records, and publications in various formats [9,19,20,22,24]. The two main techniques used in analysing these records or documents are citation analysis and content analysis. Each method has its weaknesses and biases. So, in some studies more refined techniques have been used like the critical incident approach in questionnaires or interviews. Some workers have used combinations of different techniques, for example, questionnaires and interviews, to provide internal checks against bias [5,9,19,20,22,24,25].

Another example of a not-quite-conventional method is Parker's combination of a secondary analysis [26] of previously collected questionnaire data [27] with tape-recorded depth interviews of essentially the same population. Tape-recorded diaries were collected by the Aslib Research Department [28] from scientists and technologists engaged individually in dealing with particular problems of research or development.

Hodges and Angalet [29] prepared a report based on data collected for the Department of Defense User-Needs Study. The data were collected from interviews with 1500 scientists and engineers selected from among the 1,20,000 persons engaged in work for the Department. It appears that in most of the studies, the sample is selected randomly. However in some, for example, in the studies of Hogg and Smith [30] and Herner [31], the random sample was stratified by status grades.

3. R&D PROJECTS AND INFORMATION REQUIREMENTS

All scientists need information on R&D projects, but in different forms. These projects are either user-sponsored or suggested by the scientists from the laboratory group. Distinct steps of a complex project may be described as follows [32]:

3.1 Preliminary Project Formulation

In this phase, broad objectives are translated into preliminary practical alternatives. The end result of this exercise is a recommendation that feasibility studies be undertaken on one or more of the alternatives. At this stage, they need review articles and state-of-the-art reports about the project. Any information about similar type of work conducted elsewhere is helpful to the scientists.

3.2 Feasibility Study and Report

At this stage, a little detailed information is needed. If there are several methods of achieving the end, then all the alternatives have to be studied and the basis of selecting the proposed one is to be given. Exhaustive information is necessary for better reporting.

3.3 Detailed Project Report

The report contains, in brief, details about (i) the general description analysing the environment to which the project belongs, (ii) project description giving analysis of alternatives and detailed description of the accepted one, (iii) technological aspects covering technology/process to be used and availability of know-how, (iv) financial aspects stating the estimated cost, including foreign exchange, (v) manpower requirement, and (vi) system plan. Detailed and extensive information covering all aspects of the project report is necessary at this stage.

3.4 Progress of Project Work

After sanction of the project, work is carried out as per probable date of completion (PDC). The progress is reported periodically. At this stage, the scientists require specific information and data about the project.

3.5 Final Stage

After completion of the project work, the research product, equipment/store developed, undergoes user trials. After successful trials, the design characteristics are finalised and this information is sent for use in relation to production. Relatively less information is required at the final stage in comparison to the earlier stages. The scientists rather generate certain amount of data at all these stages. These are to be compared with similar data available from elsewhere. The information supplied has to be very specific and correct.

From the above, the following general observations can be made in respect of the information requirements of scientists:

(a) More information is required at the operational/working stage than at the planning stage;

(b) The higher the hierarchical level, the greater is the requirement of information about national and international developments;

(c) Some information may be required during several or all steps of the management cycle;

(d) Information has a time dimension. It becomes outdated rapidly and new information is required to take the place of the old one; and

(e) There is a need for precise pinpointed, rather than exhaustive information.

Scientific and technological information holds the key to successful research work. The right type of information should be made available as and when required. But in practice, there is always a gap between the available and the needed information.

The information requirements of scientists depend mainly on the role they play. Working scientists require information/data about the projects allotted to them. Scientists working at the top level require information on broader aspects of the project. They also require information about similar type of work conducted elsewhere in the country or abroad. Top managers also require project-oriented information in brief along with information about the present and future needs in the light of national technological capabilities and international developments.

4. PATTERNS OF INFORMATION NEEDS

Whether from print or from other sources, a scientist needs information in three identifiable areas [33].

4.1 Current Information

The need to know what others have done recently or are doing at the moment. Personal contacts are important, but scientists regard literature as the primary source.

This information keeps the scientists current with the field and provides a broad base to give meaning to their work. This type of information is usually referred to as primary information. The primary sources of information report the results of scholarly research. These include all documents that present new ideas and research findings—scientific journals, patents, technical reports, conference proceedings, transactions, theses, government documents, and computer output, as well as oral recordings, note books, diaries.

4.2 Specific Information

The need is directly connected with a research or operational problem at hand, in the form of a bit of data, a method, the construction of a piece of apparatus, an equation, or an explanation or a phenomenon.

This information is essential for the day-to-day research operations that helps the researcher to understand the phenomenon under observation. This information is needed promptly and frequently. Sources of this type of information include documents compiled from primary sources of information, such as monographs, textbooks, treatises, manuals and guides, dictionaries and handbooks. These sources of information are referred to as secondary sources.

4.3 Exhaustive Information

The need to check through all relevant information existing on a subject. This need arises at the start of work on a new research project or when the results of investigations are ready to be reported.

At this point, abstracting and indexing services, bibliographies and guides to the literature are usually consulted.

These three needs for information are often referred to in the literature as the current approach, the everyday approach, and the exhaustive approach. The relative importance of these three types of needs varies among scientists. The fulfillment of the need for current and exhaustive information tends to be stronger among scientists, while the fulfillment of the need for everyday information tends to be less important.

5. INFORMATION NEEDS OF RESEARCH SCIENTISTS

Since Bernal [34] made his pilot study for the Royal Society's Scientific Information Conference, there have been several hundred reported attempts to investigate the methods by which scientists obtain and then put it to use the information they need. However, there has been no large-scale attempt to obtain a broad consensus on the total information problem, as seen by the working scientist.

In their efforts to establish and maintain contact with current work, scientists are continually on the alert for, or actively seeking S&T information relevant to their ongoing or planned work. Further, they watch closely the performance of the system as it operates to disseminate, display and store the fruits of their own scientific efforts.

At least half of the scientists' needs for information are of a kind that can be met by fairly straightforward reference work [35], by short and partial literature searches, and by the provision of fewer than half-a-dozen selected documents or references. Demands necessiating methodical literature searches of a mass of literature probably account for well under 15 per cent of the total.

By studying the habits, traditions and behaviour of those already using an information service , one can adjust the service to give greater satisfaction to them. This also enables the service to be cost-effective and reaches the potential users and arouses the interest and turns them into actual users.

Paisley [5] suggests a conceptual framework that places the information user, specifically the scientist/technologist, within a set of systems that might be visualised as almost concentric circles going from the broadest to the most specific influence. These systems, within which the scientist operates, are his/her culture, a political system, a membership group, a reference group, an invisible college, a formal organisation, a work team, his/her own head, a legal/economic system, and a formal information system.

The more senior the person in a large organisation, the less predictable are his/her information needs. Commonly, people do not know what information they need until a particular set of circumstances arises and then they want very specific information instantly.

Scientists have always sought information relevant to their research, information about research results and methods used to obtain those results [36].

The information needs of scientists are mission-oriented, project-oriented, and problem-oriented, depending upon the level of management they are serving. Modern management recognizes three levels, viz., (i) strategic, representing the top management and may include policy makers and those who decide the priorities in research;(ii) tactical, representing middle management and may comprise the directors of the labs/estts; and (iii) operational, representing lower level of management and may include project leaders and group officers.

These three levels which differ in their requirement of information in respect of quality, quantity and mode of its presentation. These levels are:

This categorisation into three levels cannot be taken as rigid and some overlap is inescapable. All managers direct the resources to the attainment of the objectives. The strategic level is most interested in direction that leads to the accomplishment of a long-range project, general objectives and needs mission-oriented information. The tactical level is responsible for execution of the projects and may be interested in more of project-oriented information. The operational level is concerned with immediate successive objectives for progressing the projects and is interested in problem-oriented and project-oriented information. R&D activity is highly need-based. For the purpose of this study, the scientists are grouped into three broad categories according to their status, viz. (i) junior scientists, (ii) intermediate scientists, and (iii) senior scientists.

To assess the needs of scientists one should assess the needs of junior, intermediate and senior scientists collectively.

5.1 The Junior Scientist

After receiving degree, the young post-graduate enters government service and is engaged in the activities of a junior scientist. There are cases in which, due to their own traits or lack of opportunities, they may continue to be a junior scientists for the rest of their life. When a young scientist starts his first job in government, very often he feels frustrated. He has completed studies, obtained degree, but has no experience. On entering an organisation he is overwhelmed by the practical expertise he must acquire. In most cases he follows his supervisor's advice, asks him questions and observes other workers.

If he is in a project team, he can have contact with only his project leader. The project leader is the centre of communication. He explains the job, he demonstrates the equipment and instrumentation, he goes with the young scientist and visits the working places, gives instructions, looks around and at a glance assesses the situation. The young scientist by observation of work procedure, by actually working with the equipment and by conversations with the supervisor and colleagues learns a lot.

At the beginning of his career, the young scientist reads as a matter of habit acquired at the university, but as he progresses towards the next stage of the intermediate scientist, the proportion of information acquired by reading slowly diminishes. The reason for this is the constant pressure of time and the need for information which is not readily acquired from a single or a set of printed sources. All young scientists have a similar task: to gain experience. Latest practical information is of extreme value to them. They observe and repeat simple jobs done by the supervisors. The new information gained is quickly assimilated, compared and contrasted with the knowledge previously obtained at the university and digested into knowledge.

5.2 The Intermediate Scientist

With experience, the junior scientist progresses to the state of the intermediate scientist. In most cases, the intermediate scientists become a project leaders supervising lower level technologists, and junior scientists. He knows considerably more after at least five years of experience. But his theoretical knowledge needs updating. This is the time when many scientists decide to take a higher degree. This is the turning point in the career of a scientist. His specialisation is now defined clearly, either by direction of experience, through an assignment to a particular job or by further education. He has gained the ability to make judgements and decisions, but these are still nearly always reviewed by a higher authority. The development of judgement is very important in the career of a scientist.

With the advance of his career, he is frequently called on to make decisions, which must be taken even if all factual data is not available. This uncertainty, risk-taking, is part of the scientist's competence. Very often he will be forced to take a snap decision and only later to substantiate this decision with factual and calculated evidence.

In a big organisation such as CSIR, the scientist communicates with the director and with other project officers. This communication among the various scientists is essential for the successful completion of any project. At this stage, the scientist reads less, but has more communication links with other scientists, starts to attend conferences, is sent to visit other places and writes reports and papers. A change of environment, if he moves to other jobs, also influences his horizon. The more senior his appointment, the more certain will he be of the correctness of his judgement.

5.3 The Senior Scientist

The senior scientist has less opportunities for direct use of technical skills and greater need for managerial skills. His preparation is adequate for the first two stages, junior and intermediate, but may not suffice for senior posts. Some scientists return to the university for adult education in management. Some employers recognize the need for additional education and provide the opportunity to obtain it. The senior scientist may be a director or deputy director of an organisation. He tries to maintain his general professional knowledge by reading general reports, attending conferences, or by delegating his junior staff to keep him informed on new developments. Those scientists who are now responsible for the economic soundness of their organisation must put in considerable effort in learning to develop their own managerial skills in order to take decisions involving large expenditures and maintain financial control. They communicate widely with the higher authorities of their organisations and meet many persons outside their organisation. They must have the abilities of a leader; they plan, organise, direct and control the activities of the organisation; they take decisions on the type and size of practice, the kind of clientele, and methods of operation. They recruit and are responsible for the training of personnel; provide the capital and are responsible for the economics of their establishments.

Whatever be the status of scientists, information is required in all the phases of the lifecycle of a progressing project, namely conceptual, initiation, operational and terminal phases. Information on the progress of the projects is vital for decision-making, planning and control. For example, for advising on the purchase of new equipment, the authorities need information on the cost-effectiveness of various systems vis-a- vis operational effectiveness to make the correct choice and for this purposes information services play a significant role.

6. CONCLUSION

The literature on information needs and user studies in S&T is growing in size and maturing in quality. We are moving towards strong guidelines for information system design and evaluation [5]. More adequate theories of information processing behaviour will follow.

On the one hand information needs have proved to be extremely complex and varied and user studies have so far proved inadequate to the task of completely revealing the nature and needs of information users. On the other hand it is very clear that even if we were to know exactly what would meet users' requirements in full, we would not be able to provide it to all users in all circumstances.

The scientist's need for information has remained the same over the years. Basically the services of libraries and information centres designed to fulfill these needs have not changed. It is the way in which the services are provided that has changed. Methods of providing services will continue to change as the amount of information increases and as new technologies are developed.

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CORRELATION OF JOURNAL SUBSCRIPTION AND PHOTOCOPY/REPRINT REQUESTS DATA IN A TECHNICAL LIBRARY

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1. INTRODUCTION

The journal selection process for an R&D library having diverse fields of research has been a complex issue for most of the library administrators. Factors influencing the complexicity are, (i) the phenominal rise in the subscription rates, (ii) birth of new journals, (iii) inflated economy, (iv) inadequate library budgets, and (v) users' demand for more information every year, which have forced the librarians to device new methods and techniques for selection of journals in a scientific way.

Two techniques are most popular for the selection of journals by a technical library [1], viz. journal use pattern studies, and citation analysis of primary journals and secondary journals.

In the present study, the first technique wasadopted to evaluate the productivity or usefulness of the journals. The criterionor the characteristic for the journal evaluation is the direct use of journals which ultimately determines its importance.The second method is also important from the point of view of global evaluation of journals using *Journal Citation Reports* [2]. There have been many studies on similar grounds [3- 6].Even *Current Contents*, a current awareness publication, uses similar methodology to include the contents page of a journal [7].

This paper discusses a method of evolving a journal subscription policy based on photocopy (PC) and reprint (RP) requests from the library users. The paper is based on the the data from PRDH Technical Library, Bombay which is equally applicable to any technical library of a research centre with a moderate subscriptions of journals.

2. AIM OF THE STUDY

The aim of the paper is to find out

(a) Productivity (ranking) of journals using photocopy/reprint request data and correlation of ranked data with journal subscription data;

(b) Recommendation of journals for adding to the library and thorough review (whether to continue or discontinue);

(c) Preparing a list of journals to be included in the SDI service using *Current Contents*; and

(d) To evolve policy guidelines for future selection of journals.

3. METHODOLOGY

The methodology used in this study is PC and RP request data to find out important journals. This is mainly confined to the technical and research articles. But the journals which give more coverage of product information and general awareness do not fall in the scope of this study.

The data sources for subscription anlysis are journal subscription lists for the period 1982-86 for both foreign and Indian journals. From this, a list of added/deleted titles and a list of group wise distribution of journal were prepared.

The user photocopy/reprint data pertaining to the requests for journal articles,

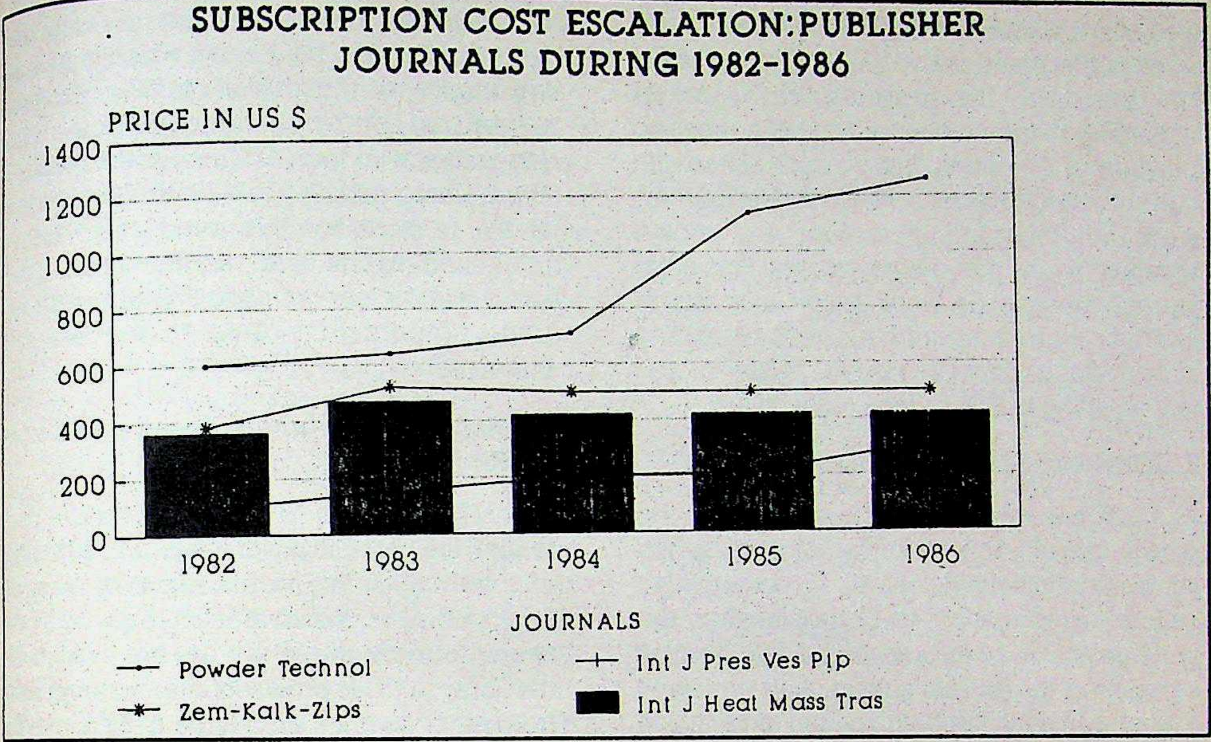

Figure 1

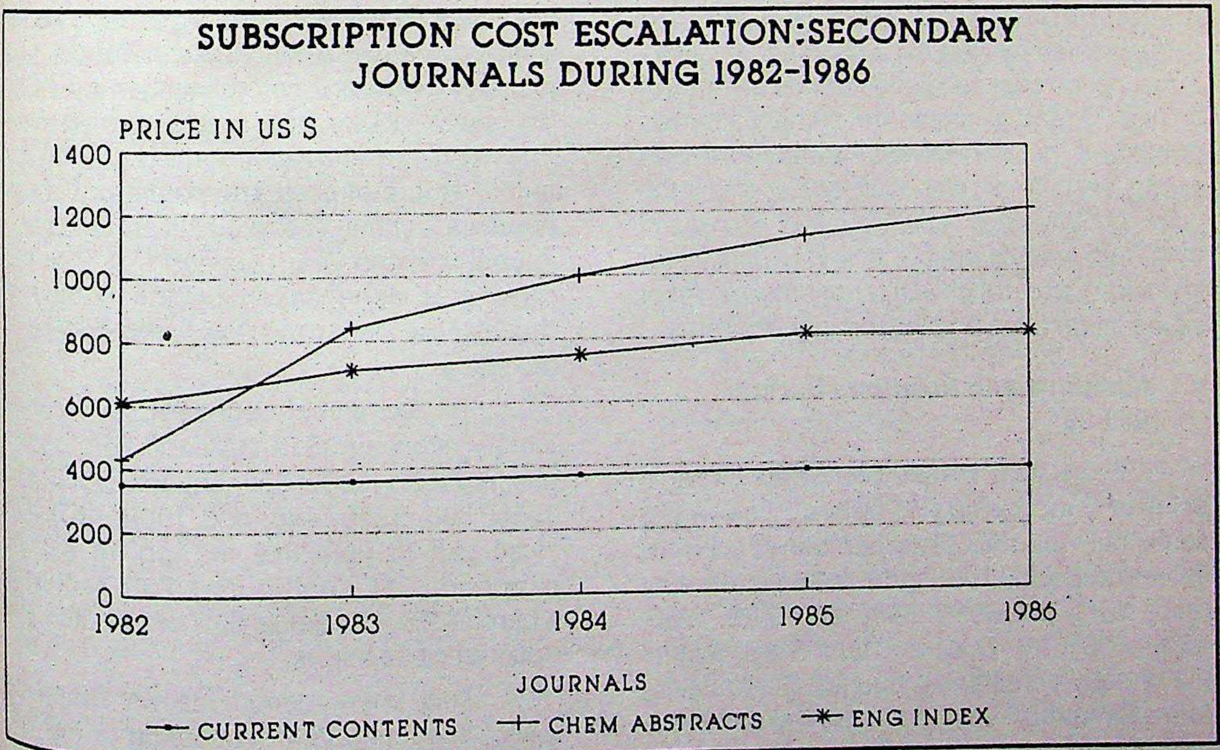

Figure 2

which are available from PRDH Library were used for the same period, i.e., 1982-86. Based on this data, the journals were ranked according to the number of requests received per journal. The same data was correlated with current subscription list (1986). Indian journals were not included in ranking for known reasons. From this, some inconsistancies in journal subscription were traced and lists of journals were prepared for recommending journals for addition, thorough reviewing, and for including in SDI service respectively.

4. JOURNAL SUBSCRIPTION TREND

The analysis has clearly shown the growth rate in terms of number of journals and yearwise additions/deletions. It has provided valuable information in understanding the problems involved in journal selection. Overall increase in the journal subscription remained almost constant for both foreign and Indian journals during 1982-86. The same holds good for the library budget also. The slight increases in the budget from time to time are compensated by cost escalation and inflation. Subscription cost escalation trends are shown in Figs. 1 and 2 for some primary journals published by commercial publishers and secondary journals respectively. Especially the price of *Chemical Abstracts* has increased three-fold in theis period. It is very difficult for any library to cope up with phenomenal rise of subscription rates and inflationary economy.

4.1 Additions and Deletions During 1982-86

Every year PRDH Technical Library is deleting some journals so as to accommodate some new journals. The number of journals deleted and added during 1982-86 in the library respectively are: 1983: 7&4; 1984: 7&9; 1985: 4&3; 1986: 6&6. This trend further aggravates the already constrained budget. But, deleting journals every year to cope up with the available resources is not a healthy sign as far as collection development is concerned. It is observed that a few deleted journals were later added in the very next years which shows the importance of those journals. For example, *Chemical Engineering Science* and *International Journal of Numerical Methods in Engineering*, ranked 1 and 23 in this study. One of the reasons for this trend could be the undefined needs and requirements of the users. Here clear cut definition of needs and requirements may help to contain this phenomenon.

4.2 Ranking of Journals Based on PC and RP Requests

The PC and RP request data are used to rank the productivity of the journals in terms of their usefulness in the ongoing research needs of users. When articles required by the users from journals which are not available in the libray, a PC is provided after aquiring them from other libraries on payment. This may be from a journal that PRDH Technical Library is not subscribing or for an article from a back volume of a journal now being subscribed. RP request means asking for an article from journals which are not subscribed by PRDH Technical Library and mostly current ones. These are provided after getting directly from author at free of cost. The nature of both the requests is same. The requests are counted by journal title and year (Appendix 1). The final ranking is done based on the number of requests per journal over the period covered by the study.

Till September 1986, PRDH Technical Library acquired 3513 PCs and RPs against user requests (1982: 832 requests, 1983: 872, 1984: 898, 1985: 448, and 1986: 463). It is significant to note that the top 10 journals (Appendix 1) contributed 738 requests, whereas the remaining 232 contributed only 1088 article requests.

This phenomenon follows Bradford's law of scattering [8,9]. According to this law, only few number of journals in a field contribute more number articles and large number of journals contribute less number of articles. The top 10 journals in this study account for 738 or one-fifth of the total requests and the top 20 journals account for 1150 requests, i.e., approximately one-third of thetotal requests while the middle 60 journals accounted for 1157 requests and the last 162 journals contributing to 1171 requests which approximately confirms the Bradford's law. The journals have been ranked using the number of requests. *Chemical Engineering Science* ranks 1 with 141 requests.

5. CORRELATION OF DATA

The purpose of correlating data is to find out whether PRDH Technical Library journal subscription is on the right track. The basic principle in journal selection is to select core journals which are more productive and relevant to satisfy user needs and requirements. If a library's journal collection represents well- balanced core journals, there will be minimum number of requests for articles from other journals. Otherwise, the library journal collection cannot satisfy users' needs.

Out of 64 titles from the subsciption list for 1986, there are only 23 jounals which are common from the ranked list (see Appendix 2). Among the 23 journals there are only eight journals which fall in the top (core) group of 20 journals (i.e., upto rank 16); eleven which fall in the middle (moderate) group of 60 journals (i.e.,upto rank 38), while the remaining fall in the third (insignificant) group of 162 journals. It is interesting to note that all the four journals in the last group have rank 41 in the present study. However the subscription list does not contain such as *Chem Eng Tech, Eng Fract Mech, Int J Fract*, and *Chemical Engg* from the top 10 journals which are very important going by the number of RP/PC requests received.

Based on the ranked list and keeping in view the budgetary constraints, it is easy to decide the titles to be subscribed by the Technical Library. Here it is suggested that all the journals up to the range 25 excluding foreign language journals may be subscribed to meet the users demands to a reasonable extent.

5.1 Journals for SDI Service

Here two points are to be taken into account, (a) effective utilisation of secondary periodicals like *Current Contents*, and (b) cost factor.

Journals ranked from 26-43 are also significant but budgetary constraints would not allow the library to subscribe all of them, and foreign language journals cannot be subscribed because of language barrier. Instead, all these journals will be scanned regularly in *Current Contents* and a photocopy of contents page of the above ranked journals will be supplied to the users so that they can ask for articles of their interest which will be later provided to them after aquiring the articles from other libraries or from authors. This serves both the purposes—optimisation of resources as well as keeping in touch with the subject and having relevant information in hand.

5.2 Journals for Review

Every user wants a comprehensive collection of information in his/her field. But it is a luxury for any small library. The way out for this problem is to select the best our of the best. Some examples are cited below:

Chemical Abstracts

A popular secondary journal, important to a chemical engineer, and most problamatic to a librarian to acquire as the cost is prohibitive for small libraries. Cost escalation of this journal is three times during the study period of five years (1982-86), i.e., from US$400 to 1200. At present the Technical Library uses the publication for scanning patent items to include in Technology Awareness, an in-house current awareness service. If scanning patents is the only purpose, it is better to discontinue this title and subscribe some other journal like 'World Patent Information' which would provide more comprehensive information on patents.

6. GUIDELINES FOR JOURNAL SELECTION

Before subscribing a journal many factors are to be borne in mind. They include the scope and coverage of the journal, whether it covers pure/applied research or product information, publishers and editorial board, language, periodicity, cost, its coverage in secondary periodicals such as *Current Contents or Chemical Abstracts*, citation characteristaics based on JCR, etc. If a library follows these guidelines, the best journals can be selected and can be used to a greater extent. This also ensures the judicious usage of the financial resources.

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APPENDIX 1

Rank	Requests	Journal
1	141	Chem Eng Sci
2	093	Chem Eng Tech
3	088	Eng Fract Mech
4	075	AIChE J
5	068	Can J Chem
6	063	Aufberiet Tech
7	056	Int J Fract
8	052	Chem Eng
9	051	Zem Kalk Gips
9	051	J Chem Eng Jap
10	046	Werkstoffe Korros
11	044	Chem Eng Comm
12	043	Metall Trans A
12	043	Sov Chem Ind
13	041	Thermal Eng
14	040	Comput Struct
14	040	Kagaku-Kogaku Ronbunshu
15	039	Rock Prod
16	038	Chem Eng Prog
16	038	Corros Sci
17	035	Cem Concrete Res
18	034	Desalination
18	034	Comp Method Appl Mech
19	032	Nuc Eng Des
20	031	J Inst Fuel (Energy)
21	029	Oil Gas J
22	028	J Electr Chem Soc

22	028	Chem Technol
22	028	Wear
23	027	Trans Inst Chem Eng
23	027	Sugar J
23	027	Int J Numer Meth Eng
24	026	Exp Mech
24	026	Mater Sci Eng
24	026	Powder Technol
24	026	VGB Kraftwerk-Tech
25	025	Int J Heat Mass Trans
26	024	Food Technol
26	024	Br Corros J
26	024	ASHRAE Trans
27	023	Int J Fatigue
28	022	Tsement
29	021	Pit Quarry
29	021	Int J Sugar
29	021	Combustion
30	020	J Powder Bulk Solids Technol
30	020	Anticorros Methods Mater
30	020	J Sound Vibr
30	020	Bull JSME
30	020	Cement -Wapno-Gips
30	020	J Heat Recovey Syst
30	020	J Food Agricul Chem
31	017	Fluidphase Equilibria
31	017	Ind Eng Chem Pro Des Dev
31	017	Int Chem Eng
31	017	J Strain Analysis
32	016	Int J Multiphase Flow
32	016	Thin Walled Struct
33	015	Cryogenics
33	015	Metal Prog
33	015	J Metals
33	015	Khim-Prom
34	014	J Dairy Sci
34	014	J Eng Mech. ASCE
34	014	Comput Chem Eng
35	013	Trans ASME
35	013	Fatigue Eng Mater Struct
35	013	J Appl Chem (USSR)
35	013	J Mater Sci
36	012	Zement
36	012	J Am Cer Soc
36	012	Am Cer Soc Bull
37	011	Epitoanyag
37	011	Petroleum Refiner
37	011	Cement Technol
38	010	Israel J Technol
38	010	J Chem Eng Data
38	010	AIAA J
38	010	Mater Technol
38	010	Int J Solid Struct
38	010	Trans Br Cer Soc

The list includes another 162 journals with less than 10 requests each.

APPENDIX 2

Journals common in ranked list and PRDH subscription list

Rank	Journal
1	Chem Eng Sci
4	AIChE J
5	Can J Chem Eng
6	Aufbereit Tech
9	J Chem Eng Jap
9	Zem-Kalk-Gips
14	Thermal Eng
16	Chem Eng Prog
20	J Inst Fuel (Energy)
23	Int J Numer Methods Eng
24	Exp Mech
24	Powder Technol
25	Int J Heat Mass Transfer
26	Food Technol
29	Pit Quarry
30	Bull JSME
31	Ind Eng Chem Process Des Dev
31	Int Chem Eng
34	Comput Chem Eng
41	Bulk Solids Handl
41	Corrosion
41	Eng Comput
41	Ind Eng Chem Fund

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INFRASTRUCTURE FOR ONLINE ACCESS

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ABSTRACT

Several international online systems such as DIALOG Information Retrieval Services, USA, can now be accessed from India through existing communication infrastructure. This note describes in detail the infrastructure required to access online databases. It also provides the various costs involved in setting up such a facility.

1. INTRODUCTION

To establish access to services like DIALOG and to search and use databases made available by them (information retrieval services), the following infrastructure is required:

- Telecommunications
- Hardware and software
- MODEM
- Password and the logon procedure
- Training
- Search aids

2. TELECOMMUNICATION FACILITY

To access an online system from a computer terminal, one needs to place a telephone call to the online system through a network of telephone and data communication at both domestic level and international level. It is typically similar to making an international telephone call.

A low-cost, high-speed, reliable access to online system requires a good data communication network as an essential pre-requisite both at domestic and international levels. In India, unitl recently, the infrastructure was not available for establishing link to international data network. Only about an year ago, this facility was established by Videsh Sanchar Nigam Limited (VSNL) at Bombay. This facility is called GPSS (Gateweay Packet- Switching Service) and connects one to international data networks such as TYMNET or TELENET. Through GPSS, one can make a low-cost data call to DIALOG.

To reach GPSS from your terminal one will again require a domestic link or network. For easy understanding, the telecommunication infrastructure is described under domestic and international links.

2.1 Domestic Link to GPSS

Depending upon the location, the following alternatives are available to connect a terminal to GPSS.

- Local PADs (packet assemblers and disassemblers) from select locations.
- Since India still does not have a fully developed public data communication network at domestic level, as a temporary alternative, VSNL in collaboration with DOT has set up local PADs. One such facility (PAD) is available at New Delhi also.
- From New Delhi, the PAD can be reached through by a local telephone call. The PAD is connected to GPSS by VSNL thorogh a dedicated line under their own arrangements.

2.2 International Link

GPSS is connected to several international data networks such as TYMNET and TELENET of USA, Packet-Switched Service (PSS) of UK, etc. Most online systems like DIALOG are connected to one or several of these networks. These networks identify your online system by a number called network user address (NUA). For example, the following are the NUA numbers of DIALOG through TYMNET and TELENET.

TYMNET : 3106900803
: 3106900061

TELENET : 311041500020
: 311041500048

(Note: 3106 represents TYMNET, 3110 represents TELENET).

3. HARDWARE-SOFTWARE

3.1 Microcomputer

Any microcomputer such as IBM compatible PCs or Apple micros can be used. Following is a typical recommended microcomputer configuration.

- PC preferably with a hard disk
- 256 kb RAM (higher RAM recommended if you are accessing a graphic database)
- Serial port
- Printer

3.2 MODEM

MODEM is a device that connects a microcomputer to the telephone line. This device translates the digital message of the computer into voice signals to be transmitted over the telephone lines and vice versa.

The modem used should be approved by Telecommunication Research Centre. Also the MODEM connection will be provided with the permission of the local telephone department. At present the permission is given by the telephone department on payment of Rs. 3,000/-.

3.3 Communication Software

The communication software sets your computer terminal into a dialogue mode with the host computer of the online system. There are several general purpose communication softwares such as CROSS-TALK, MIRROR, PC-TALK, and DIALOGLINK Communication Software, which is a special purpose software for online searching, especially DIALOG.

3.4 Password

Passords at two levels are required to get hooked up to an online system.

(a) Logon to GPSS

GPSS password, also known as NUI (network user identification) number is assigned free on request by VSNL, Bombay, for users.

(b) Logon to Online Systems

Password will be assigned by the information retrieval service (IRS) one wishes to use for accessing its databases. This is provided for a fee after entering into an agreement with the IRS. For DIALOG, Informatics (India) Pvt Ltd., assigns password for which there will be an annual service fee of Rs. 850/-. The user will be required to sign a DIALOG order form and standard terms of contract which serves as a tripatriate agreement.

3.5 Training

Searching online databases needs a good knowledge of

- The command language of the online system;
- Search Logic;
- Database structure, contents and search capabilities;
- Communication software; and
- Logon protocols.

Training in the above aspects will help reduce the online searching costs. There are many agencies which provide necessary training which can be conveniently devided into the following two modules.

(a) Online Awareness

This is to create awareness among the users of the online systems about the databases available for online searching, various online systems which provide access and the basics of accessing and searching the online databases.

(b) System Awareness

Before accessing databases through an online system, the user has to understand the basic features, commands, databases available in their subjects of interest and their structure, search strategy development, etc. which will be of immence help to the user in his online searches.

4. SEARCH AIDS

For regular reference and consultation, the user needs to be equipped with a set of search aids which may have to be continuously updated. These could be (i) online system specific search aids, and (ii) database specific search aids. These are published as priced publications by many IRS including DIALOG.

5. COSTS

The costs can be devided into one time and recurring costs.

5.1 One Time (Infrastructural) Cost

These costs include the initial purchase of the hardware and software items like a personal computer with printer, MODEM, licence fee to use the MODEM, communication software, telephone lines (in the case of an existing telephone line this is not applicable), search aids, and training.

5.2 Recurring Costs

This depends on the number of systems you plan to access. Following are the cost components involved for online usage.

(a) System Cost

This refers to the cost payable to online systems for establishing access rights and usage. This has the following components.

Password fee: This is an annual charge and depends on the system being selected for access. DIALOG charges about Rs. 850/- per year to issue and renew a password.

Computer time cost on usage: For the duration connected to the system the user will be charged. This charge is database specific and on an average costs about Rs. 1,000 per hour but payable only for the portion of the usage. One hour is divided into 1000 units for this purpose. a minute.

Output costs: This refers to the cost of information retrieved and printed which is again database dependent and costs anywhere between nothing to Rs. 25 per record for most databases, depending upon the format of printing and mode of printing. Some financial and market research databases, and full-text databases giving complete articles and patents etc. may cost much more.

Telecommunication costs.

(b) GPSS Charges

These charges consists of

International segment payable to VSNL: Rs. 4 for every minute of connect time plus Rs. 2.80 for every 640 bytes of data transmitted or received.

Domestic segment payable to DOT: Equal to either a local or STD call charges depending upon the call made to the nearest local PAD and the annual leased line fee, if a leased line exists to the local PAD.

6. INFOTEL ONLINE SERVICE CENTRE

In collaboration with VSNL, Informatics (India) Pvt Ltd. has set up online service centres at Bombay and Delhi. These centres provide a wide ranging service and support to online users, both current and potential.

—:●:—

CONFIGURING A LOCAL AREA NETWORK SYSTEM FOR A TECHNICAL INFORMATION CENTRE : A CASE STUDY

RS DESIKAN and R MUTHUSWAMY

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ABSTRACT

Emphasises the need for planning while buying computer hardware for information retrieval and library automation purposes in special libraries. As a case study, explains the steps taken in choosing a computer system as per the requirements identified already. Discusses the plus points of LAN and draws comparison with a distributive system. Analyses the system, components and peripherals and justifies the selection of the right one for the LAN configuration in terms of technical and financial considerations.

1. INTRODUCTION

1.1 Advances in Computer Technology

The revolution of integrated circuitry and the advent of personal computers (PCs) have improved the data storage and retrieval techniques across all cross sections of the society, in every field of activity, with peoples of all ages and in every level of organisational hierarchy. The technological achievements have taken place so rapidly that the speed and capability of computers are getting enhanced, physical dimensions of every component (memory, storage devices, processors, etc) are shrinking, the power consumption per unit of processing power is getting reduced rapidly. As a result, the end products (PC/XTs, PC/ATs, minis and super minis) have shrunken to the desk top size, but with the power of mainframe computers. to the satisfaction of the users, all these are happening with a crash down in prices.

As computers have become smaller, cheaper and more numerous, people have become more interested in connecting them together to form networks and distributed systems. The old model single computer serving the computational needs of the whole organisation is rapidly being replaced by a number of seperate but inter-connected computers to do the jobs. Interconnectivity among homogenous as well as heterogenous computers is becoming a reality in the advent of advanced networking hardware and software systems.

1.2 Computer Application to Libraries

Nearly three decades ago, computer application to library functions and services was a dream. Very few libraries were fortunate enough to have access to the mainframe systems. Today the application of computers has become a desideratum for nearly five hundred libraries and information centres (ICs), though their sphere of activities and fields of specialisation vary and categorically falling in different levels or scales.

The status report of NISSAT [1] has identified and categorised the libraries and ICs in science and technology on the basis of their holdings and disk space requirements for information storage. Table 1 details these categories.

The nature of activities amenable for computer application varies from library automation (i.e., routine library management functions and services), to bibliographical information storage and retrieval and data

Table 1. Categorisation of ICs in India

Unit size	Libraries	Actual numbers	Holdings (vols)	Disk space for information storage (Mb)
Small	College libraries & medium/ small Industrial ICs	214	< 30,000	< 10
Medium	Libraries/ICs of R&D, industries, universities & institutions with large research personnel	310	30,000-3,00,000	10-100
Large	Bibliographical ICs, regional ICs, national libraries/ ICs on specific subject or mission (eg. agriculture, electronics, energy, power, etc).	55	> 3,00,000	> 100

capturing from global databases (eg. DIALOG). It is encouraging to note that many institutions have put in sufficient efforts in the sphere of bibliographical information processing [1]. Data capturing from global databases has been attempted by several institutions viz. National Aeronautical Laboratory, Bangalore, DESIDOC, Delhi, etc. The availability of popular databases in CD-ROM (compact disk read- only memory) is also encouraging its use. However, computerisation and library automation have not been implemented in to in these libraries/ICs, but only in part.

It is noticed that many institutions are going in for a PC irrespective of their collection strength, users supported and services rendered. The spurt of softwares like dBASE and the free availability of CDS/ISIS to non-profit organisations have encouraged many libraries and ICs to go in for a PC without planning for suitable processing speed, memory, etc. Single user operation, inadequate disk space are bothering these ICs only after the machine is procured and used. Therfore it is obvious that a careful planning of the hardware and software requirements is necessary at the early stage itself.

2. SCOPE

In Combat Vehicles Research & Development Establishment (CVRDE), DRDO, Madras, the need for computerisation was felt and the requirement of hardware and software was assessed and specified after making a detailed survey and interacting with local computer manufacurers and vendors. In this case study, an attempt is made to share our experience with library professionals.

3. CHOOSING A CANDIDATE SYSTEM

As any other library, CVRDE also thought of going in for a PC with 8088 or 80286 processor with a clock speed of 8-10 MHz and 640 kb to 1 Mb memory and 40 Mb disk space. But when the actual amount of disk space requirement was assessed, the system we needed was not a PC, but a machine with an enhanced speed, higher memory with multiuser and multitasking capability. During 1988- 89, the Indian computer market was concentrating on 80286 (10-12 MHz) mini/multiterminal machines. Simultaneously local area network (LAN) also emerged as a promising system. Subsequently 80386 chip was introduced in early 1989 and 80386 (20

MHz) machines started coming in the later part of the same year. Among the various configurations, choice of a most suitable system within the available resources had become a tough task.

3.1 Characteristics of the System

The following requirements were identified.

(a) Basically a dedicated system for library, information and documentation functions and services;

(b) A database management system (DBMS), capable of handling bibliographical information with high volume of transactions;

(c) User-friendly system, enabling the non-computer professionals to operate without any problem;

(d) Run on online, real-time mode and should accept, store, process and retrieve data as desired and specific information for particular queries;

(e) Provide multitasking and multi-user capabilities with minimum time for transfer of data among user terminals;

(f) Having potential to run the most popular DBMS software (IBM- compatiable under DOS environment) and other utilities as well as compilers like BASIC, COBOL, PASCAL, etc.;

(g) Capable of providing maximum data security;

(h) Rugged in hardware architecture;

(i) Amenable for future expansion in terms of processing speed, RAM, storage memory and peripheral devices; and

(j) Amenable for future expansion in terms of addition of number of workstations as well as for establishing connections with other LANs and distributive systems in a widely dispersed environment.

4. LOCAL AREA NETWORK

4.1 What Is a LAN?

Hardly within ten years of introduction of the concept of LAN, it had constantly invaded all conceivable types of applications and progressed from a relatively simple speed coaxial bus topology to sophisticated high speed fibre optic-based system. It is foreseen that by 1993, every second PC will be a part of a LAN. The existing LAN units in the world (53,27,000 units in 1989) will double by that time (104,39,000 units in 1993) [2]. LAN technology is still evolving and what is installed today may not be current even in an year from now [3].

The IEEE defines LAN as, a data communication system allowing a number of independent devices to communicate directly with each other, within a moderately defined geographical area over a physical communication channel of moderate data rates [2].

From the above definition, we can infer that each computer forming part of a LAN, having autonomous and independent status as a characteristic. LAN is an interconnected collection of autonomous computers. This is in contrast with the distributive system, wherein a centrally located processing (master) system controls the terminals (slaves). The processor (CPU) and memory of the distributive system are located in the master system and the terminals are called dumb terminals since they do not have any processor or memory [4]. LAN allows resources such as disks, printers, and most importantly, programs and data to be shared. Economically LANs are better investments than distributive systems. LAN components benefit from the competetive atmosphere of market place. Once the distributive system is purchased from a manufacturer, the purchaser becomes a captive customer locked into the vendors' product lines and prices. LAN can grow in small increments one workstation at a time. In a distributive system, often one must buy a component that enhances the system by a quantum jump [3].

4.2 Fileserver

In a LAN, a fileserver performs all major mass storage and retrieval functions, and a number of workstations are capable of processing data on their own. The fileserver and workstations are interconnected only with a purpose of sharing data among the nodes. It only coordinates with the nodes to attain an efficient interaction with the users [5].

4.2.1 Data Security

Another important task of the fileserver is to guard and protect the data from failures, catastrophes and incompetent and delinquent persons who might falsely update them. Unauthorised persons are discouraged from entry to the network in the very begining itself through logon procedures. Only authorised users, who know the logon procedure can get into the network. In addition to this password protection also ensure denial of unauthorised entry.

In LANs, the system manager can restrict even the authorised user only to READ a particular file or only to WRITE (add on data) on a particular file or only to READ AND WRITE. The authorised users may even be restricted to create, open or delete the files. A single user or group of users may only be allowed to get into a directory.

4.2.2 Types of Fileservers

Today, mostly the fileservers are PC-based. Two important, distinct fileservers are concurrent and dedicated servers. The concurrent servers functioning both as server and as workstation differ from dedicated servers functioning solely as servers [2]. A fileserver may also serve as a print server. There are application-specific servers designed for DBMS, fax, electronic mail (E-mail) and remote access functions. They are identified as database (SOL) servers, fax servers and communication servers. One can have anyone or all in a LAN network. Currently a majority of the installed multiuser systems are performing server tasks as a secondary function [2].

4.3 Workstations

The workstations in a LAN are independent, autonomous computers. Generally a PC or PC/XT will be used as a workstation. One can go for a PC/AT or 80386-based system if the processing load is high at a particular station for better performance and to enhance the throughput of the network. One may configure workstations with or without hard disk or floppy disk drives. In fact, diskless workstations are costwise cheaper. They may be remotely booted through fileserver. Another important advantage is that they can even be operated in non-airconditioned environment.

5. SYSTEM HARDWARE AND COMPONENTS

Having known the advantages of LAN, we analysed each hardware system, component, periheral and system software compatible for PC-based LAN. The following is the analysis which helped to configure our LAN.

5.1 Processor

The processor or CPU is the heart of the fileserver or workstation. It is characterised by 'clock speed' expressed in MHz. The fileservers have to communicate with their workstations at a very high speed. Therefore, they require high speed 16- or 32-bit processors. Intel's 80286 (20 MHz), 80386 (25 MHz) or 80386 (33 MHz) appeared as ideal processors. 80286 is mostly suitable for low budget LAN configurations. However, it is less sophisticated in design when compared to both the 80386 processors. The 80386 processor is also compatible with Intel's 8086, 8088, and 80286 and runs on programs written for those processors, but faster. It lets programmers write more sophisticated programs. Its architectural technology is its ability to run multiple applications in protected memory areas. A true 32-bit (word size) external address is possible only with 80386. Its architecture provided scope for use of Unix and Novell Net Ware (networking opearting system—NOS) concurrently and thus connectivity among seemingly incompatible machines (based on operating system) is achieved. The cost of 80386 (33 MHz) processor is slightly high. One can save Rs. 5,000/= by going for a 80386 (25 Mhz) processor-based machine.

The next one in the hierarchy is 80386 (25 MHz) processor. Keeping in mind the workload in CVRDE, an 80386 (25 MHz) processor was preferred for the fileserver. For the workstations, an Intel 8088 processor with 0 MHz speed was found ideal since they do not involve much load.

.2 Memory

A fileserver requires adequate main memory (RAM) to run the NOS, host operating system, application software and data as well as interacts and communicates with other workstations. The minimum memory requirement suggested wass 2 Mb and the same was incorporated in the configuration. However, the flexibility of the system to expand memory upto 16 Mb in the mother board is desirable.

.3 Mass Storage

A fileserver or workstation may have one or several floppy and hard disk drives attached to it [3]. A fileserver under Novell Net Ware can theoretically handle upto a total of 2 gigabyte storage memory on two physical hard disk drives. At present, in reality, the hard disk drives are available in 105, 145, 300 and 340 Mb ranges (there may be disks with some other capacity configurations). Since 40 Mb disks cannot handle the heavy traffic of the network and storage demands of an 80386 LAN server, they are eliminated from this analysis [6].

As the disk size is large and network traffic heavy, a controller/adopter is employed as an interface to monitor storage functions in high capacity disk drives. Enhanced Small Device Interface (ESDI) is one such controller. It can run two hard disks and the core lets the user install upto three controller in fileserver or workstation.

Small Computers System Interface (SCSI) is not a controller, but rather a high speed (10-17 mbps) general purpose communication device. Bench mark tests [6] show that SCSI may out perform ESDI when controlling multiple drives because the controller built into SCSI drives lets the system retrieve data from several sources simultaneously. Some SCSI boards can run upto seven drives and the theoretical maximum memory capacity is estimated in gigabytes.

5.4 Visual Display Unit

The capabilities of VDU are enhanced through increased character/graphics resolutions. More the pixels, clearer the image or character on the screen. Graphic adapter cards available at present include Colour graphic adapter (CGA) (16 colour shades), extended graphics adapter (EGA) (64 colour shades as well as in monochrome) and video graphics adaptor (VGA) (256 colour shades as well as monochrome) [6]. We preferred CGA card with a softwhite 14" monochrome monitor for the fileserver and one colour monitor and three monochrome monitors for the workstations.

5.5 Network and Networking

5.5.1 Cables

The communication media through which interconnections could be made are coaxial cables or twisted pair cables. Communication is transmitted by means of electric signals in these cables. Fibre optic cables are costly solutions though their transferring efficiency is high. Among the cabling technologies available, twisted pair cables are becoming popular [2]. Twisted pair cables are common in telephone installations. Typically an Ethernet LAN would use 50 ohm coaxial cable. IBM network would use cable TV's 75 ohms cable. A baseband Arcnet would use 93 ohm cable [3].

5.5.2 *Topology*

The way in which various workstations and fileservers are connected together is referred as 'topology'. The goal of topology design is to achieve a specified performance at a minimal cost. The LANs in existance today use the star, ring, or bus topology. In star topology, the workstations are connected to the fileserver with separate lines, while in a ring, they are linked to each other serially, in a circular fashion. The LAN nodes are linked serially, in a straight line in a bus topology [5]. In star topology, when communication between two nodes needs to occur, a complete circuit is dedicated to the connection till that transaction is complete. So the wiring is not shared whereas in bus topology the media is shared [3].

5.5.3 *Communication Mode*

Simplex, half duplex or full duplex lines are used to transmit data from one point to another. In a simplex line, information travels in only one direction; in half duplex, data can travel in both directions but not simultaneously. Full duplex lines have the highest potential as they can transmit data in both directions simultaneously. Whereas twisted pair and coaxial cables can support full duplex and half duplex fibre optics cables cannot [3]. The rate of data transmission in such media is usually between 0.1 and 100 mbps [5].

LAN signalling technologies are of two types. Baseband and broadband signalling. In all LAN situations, data is transmitted digitally. This means switching from one state to another. These states are often thought of as ON and OFF. Baseband and broadband are the two popular signalling techniques, among many, representing these two states [3].

The interacting nodes in a LAN transfer data with very high speed through the cables connecting them. If a set of data is sent from node 1 to node 3, it may reach its destination using the traffic line. In case node 2 also sends a set of data to node 4 in the same traffic line, there is a data collision. Owing to these reasons, the set of data to be transmitted are divided into 'packets' and coded. There is a device called traffic matrix which controls the flow rate of data per second [7].

5.5.4 *Access Techniques*

In addition there are access techniques to regulate data transmission. Carrier Sense multiple access (CSMA) and ring nets are popular access techniques employed in LANs. In CSMA, when a node has data to transmi, first it checks the traffic flow in the channel and if the channel is free, it transmits data. If there is data collission it waits for a random amount of time and starts all over again. There are variants in CSMA access techniques. In one such variant, all nodes monitor the cable during their own transmission and terminating transmission if a data collission is detected. Ring net is a series of point-to- point connected cables between consecutive stations. The ring net uses the active interface unlike the passive interface in CSMA. The oldest and still most popular kind of ring net is called a 'token ring'. In this kind of ring net, a special bit pattern called 'token' circulates around the ring whenever all stations are idle. When a node wants to transmit a packet, it is required to seize the token and remove it from the ring before transmitting. Owing to this cumbersome procedure, there is delay in the transfer of information. To sum up, the simplest access technique is the CSMA, which continues to transmit the current packet even when a collission is occurring [7].

5.5.5 LAN Interface Units

Normally all the media access and signaling functions are integrated into the components called 'adopter'. These are available in two varieties, the plug in card and serial adopter. Plug in LAN adopters are printed circuits boards where the plug directly fits into the bus socket of a PC mother board. RS232 C external device adopters are used for PCs which are compatible to IBM PC software but not hardware.

Hubs are components required for token passing LANs. Hubs provide electrical connections between the adopters. Passive hub is a 4 port user hub and active hub is an 8-port 8-user hub [3].

5.5.6 Criteria for Selection

The important decision to be made on the basis of criteria discussed above, is about the network interface i.e., 'Arcnet' card or 'Ethernet' card for the workstations and the fileserver. The data transfer rate of the Ethernet design is 10 mbps. in contrast to Arcnet design with a transfer rate of 2.5 mbps. The full efficiency of Ethernet design can be exploited through a bus topology. The Arcnet prefers a star or ring topology. However, in both the designs, there are merits and demerits. As per LAN trends in India, Arcnet is a low-cost solution, and will remain strong for quite sometime [2]. The difference between Arcnet and Ethernet cards will be around Rs 2000/- per workstation.

LAN provides facilities to start with a small configration and to extend it into a larger one. Repeaters are required to interpret signals that have been greatly attenuated by having travelled a long distance away from the LAN [3].

5.5.7 Network Operating System

In a LAN, NOS is an umbralla operating system coexisting with fileserver's operating system as a shell over it. The NOS should be rich in functionality. It should contain file serving, print serving and print spooling; a security to include login, password protection, and ability to control access to indidual files and E-mail.

Regarding NOS, a number of companies are offering software. They include Novell, IBM, Microsoft, Comex, Falcon and others. The most popular among them are Novell. At the low end of Novell's PC LAN scheme is elementary level software (ELS) which comes in 4- and 8-user versions. ELS lets the user run small LANs without a server. Another product is 'Advanced Net Ware/286', mostly suitable 80286 system servers. While most advanced LANs run with a dedicated server, one can actually use them without such dedicated server. Advanced Netware consumes a large amount of memory processor power so that servar machine is probably not useful for any large task. Most LANs need a dedicated server. The next setup is 'system fault tolerant (SFT) Net Ware/286' which to adds Advanced Net Ware some features to protect the data disks. It supports multiple disk drive controller, disk mirroring (the exact duplicate copy of the data will be maintained) and uninterrupted power supplies. It also includes a Transactions Tracting system, which is designed to improve the reliability of the database operation. The new cornerstone of the Net Ware family is Net Ware 386, designed to take the advantage built-in mutitasking and memory management features of 80386s. It offers more power and much more modular design than its predecessors [8,9].

Inspite of the range of sophistication in the Novell's NOS products, the cost becomes the most important criterion for the selection. The ELS II costs Rs. 40,000/- and the

Advanced Net Ware 286 costs Rs. 70,000/-. The Novell Net Ware 286 SFT (Rs. 1 lakh) and Novell Net Ware 386 (Rs. 1.75 lakh) are costlier solutions-costs given here are approximate, current costs only. Our preference lies on Advanced Net Ware 286.

The most popular MS-DOS version 4.1 is preferred as the operating system. The DBMS (4GL) software available in LAN version includes dBASE IV, FOCUS, FOXBASE, ORACLE, etc. There are special application software tools developed by Novell which include BTRIEVE (Record Management System), XTRIEVE (Interactive Report Writer/Query System), XQL (RDBMS) and Net Ware SQL (open-ended RDBMS).

6. LAN CONFIGURATION

To sum up the following emerges as the solution for the specification for the LAN configuration at CVRDE:

Fileserver

- Intel 80386 CPU at 33 MHz
- 2 Mb onboard RAM, expandable upto 16 Mb on mother board
- 1 X 1.2 Mb floppy disk drive
- 300 Mb (formatted capacity) hard disk drive on SCSI controller
- 1 RS232 C serial port and 1 Centronics parallel port and 8 expansion slots
- CGA card with softwhite 14" monitor and 101 Nos. keyboard
- Ethernet card with cable

Workstations

- 4 Workstations
- PC with Intel 8088 processor at 10 MHz
- Memory 640 Kb
- 1 X 1.2 Mb floppy disk drive
- Ethernet card
- CGA card with monochrome softwhite 14" monitor for three workstations and one colour monitor for the fourth workstation with 101 Nos. keyboard for all workstations.

Software

- Novell's Advanced Net Ware 286
- MS DOS v. 4.1 or the latest
- DBMS = dbase IV; Spreadsheet (LAN versions)
- Compiler : Microsoft Pascal

Backup

- 40 Mb cartridge tape drive built in the fileserver

Printer

- Dot mátrix printer (132 col/300 cps)

7. CONCLUSION

In this paper an attempt has been made to share our experiences in configuring the LAN for our libray automation and information retrieval functions and services. Comments and suggestions on the above configurations will be accepted with thanks.

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My Lord, I do here, in the name of all the learned and polite persons of the nation, complain to Your Lordship as First Minister, that our Language is extremely imperfect; that its daily improvements are by no means in proportion to its daily corruptions; that the pretenders to polish and refine it have chiefly multiplied abuses and absurdities; and that in many instances it offends against every part of Grammar.

—Jonathan Swift

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